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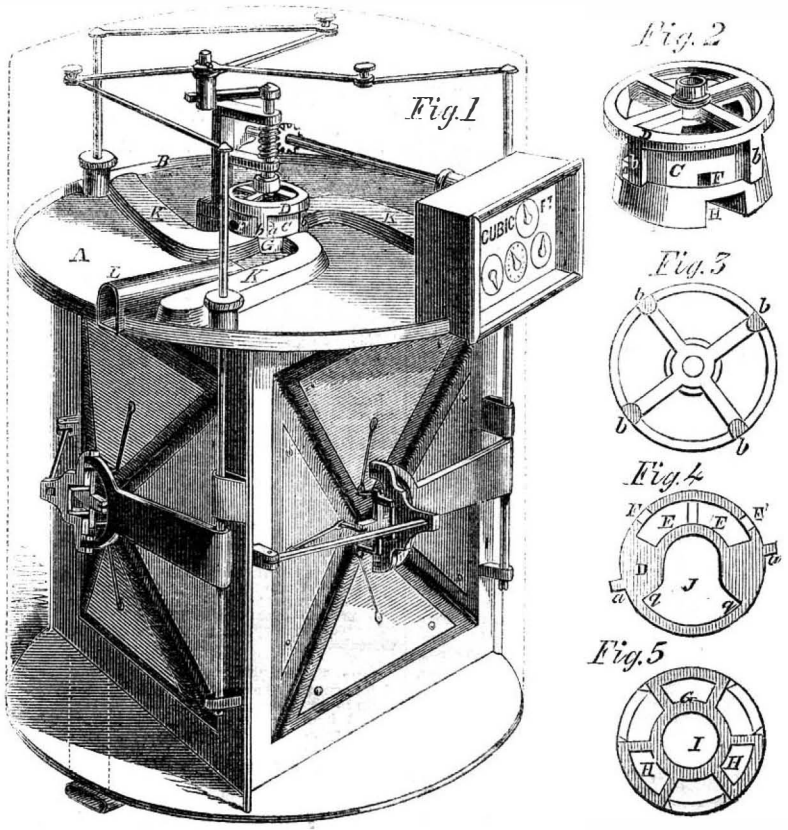
Light—The Law of Reflection.

By the reflection of light is understood that property by which, when light falls on any smooth surface, it is thrown off from it again. There is a fixed law of optics as to the direction in which the rays are thrown off, but this law it is not necessary here to explain. The result of it is sufficiently familiar to all. How often have we beheld, with delight, the surface of the calm sea at sunrise, with a long path of light glittering on its waves between the eye and the sun! How often have we admired the golden clouds of morning reflecting the sunbeams before the luminary itself has risen above the horizon! These and innumerable other phenomena have their birth in the law of reflection. Now it is this law which makes our eyes of use to us. Every object in nature is seen by reflected light except the sun, the stars, and other luminous bodies which are visible by their own rays. Every other object is seen by the light which is thrown off from it, and which forms a picture or image of such object in the eye of the beholder. The mountains—the lakes—the clouds overhead—the ocean below—the sparkling rivers—the gloomy wood—the countenances of friends—the walls of our apartments—the perception of these and all other objects of sight we owe to light reflected or thrown off from them. But to go further: were it not for this law, not only should we perceive nothing except luminous bodies themselves, but even at the hour of noonday, the whole surface of the earth and the waters would be as dark as night; in short, nature—as far as the sense of sight has anything to do with our perception of it—would be obliterated. To prove this only a single and and simple illustration is necessary. Black substances are called black because they do not reflect the rays of light; hence the impression on the eye of what we call blackness or darkness is nothing more or less than the absence of reflected light. So if all nature, like black substances, reflected none of the rays of light, everything would be involved in common gloom.

We are aware that these simple facts regarding the law of reflection are not new, but, we doubt not, many of our younger readers will be enlightened on this subject for the first time by the plain statement here set forth.

SUPPLEMENT.—It was our intention to have issued another illustrated supplement with this week's number of the SCIENTIFIC AMERICAN, but we have been deterred in our good design by the care and attention required in the fitting up and removal into our new office. We shall not disappoint our readers in this respect.

LLOYD'S DRY GAS METER.



On one or two occasions we have given our opinion of the gas companies, and we have no need to reiterate it here, but for some reason or another, they pretend to have a great objection to the dry gas meter, and will not supply the consumers with them if they possibly can avoid it. As the dry meter is more correct and less trouble than the wet one, the consumers should insist upon having them placed in their houses.

The subject of our engravings is an improvement in the dry gas meter, which renders it more perfect, and much less liable to accident than it has hitherto been.

Fig. 1 shows the interior of the meter, the dotted lines showing the outer case, which is removed. Fig, 2 is a perspective view of the rotary valve that is placed on the top, and which constitutes the improvement. The other figures are detached views of the valve.

A is the top of the chambers and lower surface of the gallery of the meter, provided with a rim, B, and C is the circular valve by which the gas passes in and out of the six compartments of the meter in which it is measured. C is provided with openings, E E (seen in Fig. 4), through which the gas escapes into the gallery of the meter to supply the burners, and there are two notches, F F, in C, to break the continuity of the lower surface. C rests upon a seat, G (Fig. 5), provided with passages, H, that communicate with the interior of the cells. When the valve, C, is placed on G the lower surface of C fits accurately to and slides upon the seat, except at the notch, F, the edge of which being sharp scrapes off any resinous or other deposit that might remain from the gas, and thus interfere with the working of the valve, and the surface of H is also kept clean the same way, by their sharp edges, around the central aperture, I; connected with I is a central tube running down through the center of the meter, and terminating in a horizontal table closed by a screw cap. The gas enters the meter through L, from which it passes into this centre tube, and thence up through I in the valve seat into the central depression, J, in the valve, C (seen in Fig. 4), and thence alternately through one or other of the passages, H, into the compartments of the meter. As the gas passes into the central tube vapors will be condensed, and they can at any time be removed by unscrewing the cap in the table before mentioned. The rotary motion is given the valve by means of a carriage, D, provided with arms, *b*, that catch against projections, *a*, on C. This is moved by a crank connected by levers with the expanding sides of the meter. The passages, K, communicate between the valve and the inner chambers. This meter cannot get clogged by deposits or moisture, and it is a great improvement on the common one.

It was patented June 22, 1588, by the inventor, C. C. Floyd, of Philadelphia, Pa., who assigned it to Hopper & Gratz, of the same place. Any information may be obtained by addressing Code, Hopper & Co., Philadelphia, Pa.

Greatness of Little Things.

Scientific research iterates and reiterates one moral—the greatness of little things, and the importance not only of the minute study of facts, but of the study of minute facts. One can imagine the contempt with which the "practical men" of the last century listened to the news that a bitter controversy was raging between two Italian philosophers as to the reason why a frog's leg twitches under certain circumstances; and yet therein lay the bud of the electric telegraph and electro-plating, and numerous other undertakings in which the practical man of the present day, though as averse as his ancestors to every investigation whose fruits are not immediately visible, is very happy to invest his money. The study of snow-balls, piecrust, and squeezed wax has led the physical philosopher to comprehend two of the greatest natural phenomena—the cleavage of rocks and the structure of glaciers. A century ago, the collecting of fossils was regarded as an occupation of about the same dignity as the accumulation of old china. Now, the coal miner risks his capital upon the strength of the evidence they afford, and the landed proprietors of some of our eastern counties pocket many thousand pounds every year by selling the phosphatic fossils whose nature was first pointed out to them by a country clergyman who happened to be a man of science. And not only does the gradual widening and perfecting of our view of nature bring with it a respect for the influence of the study of minute facts on the advancement of knowledge and the bettering of man's estate, but it tells us that, apart from all consideration of man and his wants, minute and seemingly most insignificant agents have played a mighty part in the history of our globe.—*Engineer.*

Merits of Gutta Percha.

On page 170 of the present volume of the SCIENTIFIC AMERICAN, there is published a letter from I. H. Norris, in which it is stated that its author had seen gutta percha which had become quite brittle when used as a covering for submerged wires. It is stated that it is liable to crack open as if cut across with a knife, when bent or made to take a short turn. In reference to this statement, Mr. S. C. Bishop, No. 181 Broadway, this city, asserts that *pure* gutta percha will not crack as represented; and he has shown us some telegraph wires which were covered with it five years ago, the coating of which appears to be as perfect as when first put on. The wire which Mr. Norris saw, he thinks, must have been coated with an adulterated article, not *pure gutta*,

Mr. Bishop manufactured the cable covered with hemp to which we alluded on the page referred to above.

Curious Experiment.

M. Groux, the man with the thoracic cavity which admits of an inspection of the internal mechanism, has had an electro-magnetic machine made which, applied through the orifice, tinkles a bell with every pulsation of the heart. The machine was made by Mr. Farmer, of the Alarm Telegraph office. Recent experiments were made in connection with the exact and delicate apparatus in the Observatory at Cambridge, The operating forces were divided, one portion taking their post at the Observatory, the other in Boston. The principle agent, M. Groux, himself, being here, the heart's impulses were transmitted over the electric wires, and instantaneously recorded at the Observatory. -*New York Journal of Commerce.*

Removal of the Scientific American Office.

By reference to our imprint and other advertisements it will be seen that *we have removed our office* to No. 37 Park-row (Park Building), New York City. All letters, papers, documents, remittances, models, &c., should be addressed as follows:—

MUNN & CO.,
No. 37 Park-row (Park Building),
New York City.

N. B.—Parties who have addressed us at our former office, without knowing of our removal, need not have any fears as to the receipt of their communications, as we have a box at the Post Office, and the express-men know where to find us.

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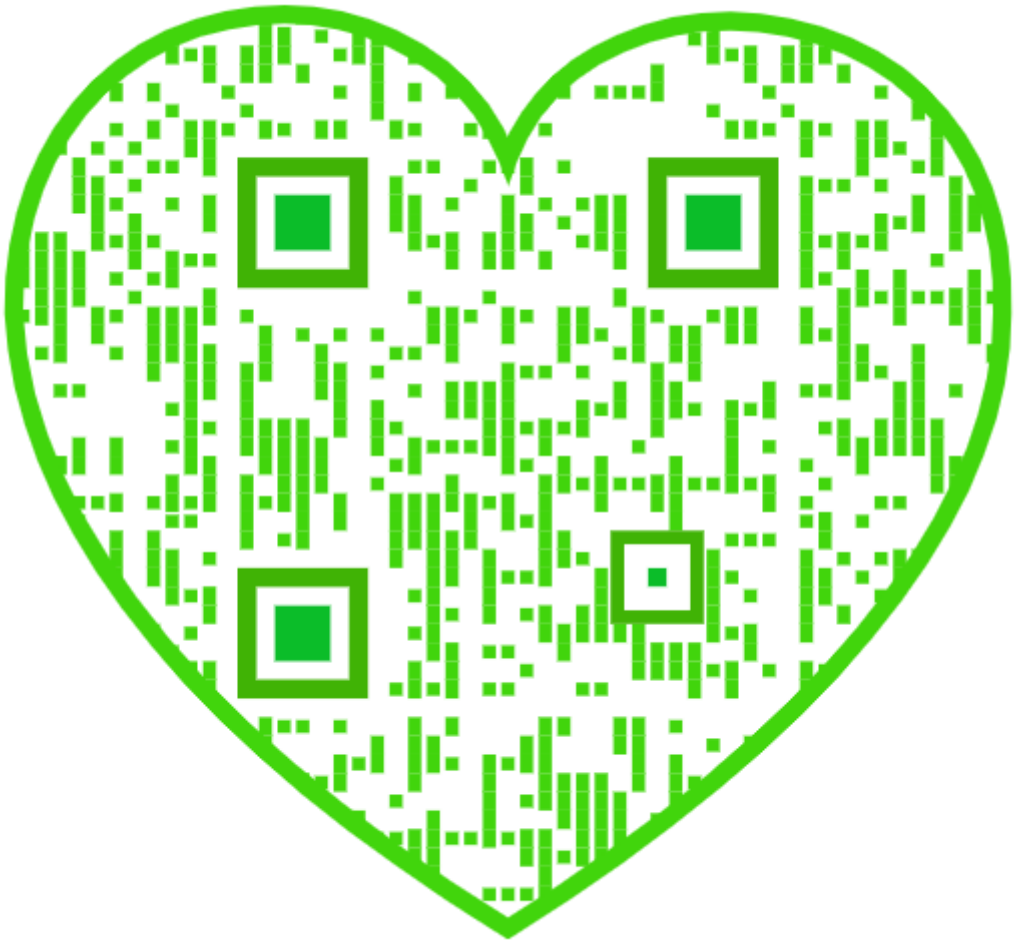

Issued from the United States Patent Office
FOR THE WEEK ENDING JANUARY 25, 1859.

Reported officially for the Scientific American.]

*** Circulars giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

TREATMENT OF FATTY ACIDS—J. C. Appenzeller, of Cincinnati, Ohio: I do not claim subjecting the fatty matters mixed with lime to the direct action of steam.

But I claim as my invention, after subjecting the mixture for a time to the direct action of steam, shutting off the steam from it, and raising its temperature by the application of heat to the exterior of the vessel, substantially as described.

This tank is for the purpose of first treating the fatty matters with steam, and afterwards by the application of heat to the exterior of the tank, which contains a rotary stirrer, keeping the fatty matters and alkalies constantly agitated during the process of saponification. By the use of this tank, both time and labor are saved.]

VALVES FOR STEAM ENGINES—Robert Bailey, of Troy, N. Y.: I claim the arrangement and combination of the tubular valve, I, seat, C, induction pipe, D, eduction valve, E, levers, H M, and cams, J J N, substantially as and for the purpose shown and described.

[The puppet valves of a steam engine are, in this invention, constructed with hollow tubular stems fitting with stuffing boxes directly to the induction and eduction pipes of the engine, and making communication directly through their interiors and around the exteriors of their seats between the pipes and the cylinder, thus very simply making them balanced valves.]

CAR SEATS AND COUCHES—W. M. Baker, of Walpole, Ind.: I claim, first, The arrangement and combination of the boards, G F, arms, i, curved bar, e, legs, K, fenders, l, slide, E, seat, B, and rods, C, as shown and described.

Second, The arrangement and combination of the curtain, H, the seat backs, D, drums, Z, weights, v, curtains, u, and rod, I, as shown and described, so that when the rod, I, descends, the curtains, u, will fall, and the curtain H, rise, and when the rod, I, is released, all the curtains will be simultaneously rolled up.

[This invention consists in having an upright rod placed at each end or side of an ordinary reversible car seat, and having a supplemental seat and couch fitted between the rods, and allowed to slide up and down on them, these parts being used in connection with the curtains and a sliding couch, the whole being so arranged that some of the parts may be folded out of the way by day, and so disposed at night as to form couches to accommodate all the occupants of the day seat.]

BRICK MACHINES—Gerard Bancker, of New York City: I claim, first, The combination of the adjustable plunger, K, with the side rods, L, and rods, j1 and j2, of the rotating mold box, for operating the compressors in the manner described, for the purposes specified.

Second, I also claim the use of the cleat, Q, in combination with the rotating molding box, G, and semicircular stationary cap plate, N, substantially as described and for the purposes set forth.

Third, I also claim the use of an elevator plunger, R, operating as set forth, in combination with the rectangular rotating mold box, G, adjustable compressors, H1 and H2, and cap plate, N, as a device for molding and compressing clay into bricks, and discharging the same therefrom.

APPARATUS FOR DISPLAYING STEREOSCOPIC PICTURES—Joseph Beckel, of New York City: I claim, first, In combination with an endless chain of pictures constructed and arranged as described, the revolving prism, a a a, arranged and operating as described.

Second, The rest or stop, C, arranged and operating as specified.

Third, The concave, D d D, arranged and operating in the manner described.

Fourth, The pads or cushions, 1 2 3 4, &c., arranged and operating as specified.

WIND WHEELS—W. H. Benson, of Wetumpka, Ala.: I claim constructing a wind wheel of a series of strips or slats, a, placed centrally on a shaft, A, spread and overlapped and secured together and to the shaft, A, substantially as shown and described.

[This wheel is constructed of a series of thin strips of wood, or other suitable material, placed on a common axis, which passes through their centers, and the strips are so dispersed one above the other as to form something like a screw propeller. The object of the invention is to obtain a wheel extremely simple in construction, and one that may be readily repaired when necessary.]

SODA WATER APPARATUS—Edmund Bigelow, of Springfield, Mass.: I claim the arrangement of a set of sirup cans, ice chamber, and draft pipe, substantially as described.

I also claim the combination of a measuring faucet with the described and claimed arrangement of devices for drawing sirups and soda water.

MACHINERY FOR FORMING HAT BODIES—Seth Boyden, of Newark, N. J.: I do not claim the endless apron, C, picker, B, and rotating perforated cone, E, for these have been long known and used in machines for forming hat bodies.

But I claim conveying the fur from the picker, B, to the perforated cone, E, by means of jets of steam issuing from the tubes, d, arranged relatively with the picker, B, and cone, E, substantially as described, to effect the deirbed purpose.

[The fur is conveyed by a novel means from the picker to the cone on which the hat body is formed, and the thickness of the fur is, by this machine, placed entirely under the control of the operator. The invention consists in having steam pipes provided with adjustable tubes placed in such relation with the picker and cone that the steam will convey the fur from the picker to the cone, and deposit the fur on the same in a proper state favorable to the expeditious forming of a hat body.]

LOUNGE—John G. Broemser, of St. Louis, Mo.: I claim the described arrangement of the spring catch, G, and the serrated arc, F, in combination with the pawl, f, which gears into ratchet teeth, e, at the lower edge of the hinges, D, and which is attached to a rocking cross bar, E, and connected to the catch, G, substantially as and for the purpose set forth.

And I also claim the valve, K, in the seat, A, which is operated by an arbor, L, and by means of a cam, l, and a hook, m, in combination with the sliding frame, N, constructed substantially as and for the purpose specified.

[This is a novel and convenient lounge, suitable for every house, as it is especially comfortable for the sick.]

BOOT JACK—Wm. W. Cansler, of Baltimore, Md.: I claim the metal folding boot jack described, with pointed prongs and pointed end, as a new article of manufacture.

MOLE PLOW—Jarvis Case, of Bloomington, Ill.: I claim, first, So suspending the mole to the beam or coulter as that it cannot go vertically beyond a given depth whilst it may move laterally, substantially as described.

Second, I also claim extending the nose of the mole into the rear of the coulter, so that it cannot at any time run out of the line of cut of said coulter at its point, substantially as described.

FIELD FENCE—Seth Cheney, of Riantone, N. Y.: I claim the particular construction of panels and its combination with the rails, in the manner and for the purposes set forth.

LAMPS—Samuel Cheney, of Cleveland, Ohio: I claim the gas tube, G, and openings, E E, in combination with the wick tube, C, and cap, H, when these several parts are constructed and arranged as described, and operating substantially in the manner and for the purpose set forth.

AMALGAMATOR—Augustus M. Church, of Augusta, Ga.: I do not claim to have invented any of the separate parts of this machine, as they have been long used for various purposes, and are well known.

I claim the arrangement described of the vibrating riffles of the inclined trough, constructed and operated as set forth, by which it is proposed to save the finest particles of the gold by amalgamation.

METHOD OF HANGING RECIPROCATING SAWS—John C. Cline, of Philadelphia, Pa.: I claim the employment of a spring either straight or spiral to suspend the fulcrum of pitman bars, or other reciprocating levers, in the manner substantially set forth in the foregoing specification.

PORTABLE BEDSTEAD—Francis Cotton, of Brooklyn, N. Y.: I do not claim a jointed bedstead, so that when not in use it may be folded.

Nor do I desire to claim constructing an invalid bedstead in which the head or feet of the invalid may be raised or lowered by elevating or depressing either of the end supports.

Nor am I desirous of claiming the use of side rails hinged at a given point, to enable them to be folded.

But I claim the arrangement of the stand rails, straps and end supports, the whole forming a new and improved article of manufacture, namely, an improved portable bedstead.

PAPER RAG ENGINES—Isaac N. Crehore, of Boston, Mass., and Francis Stiles, Jr., of Leicester, Mass.: We are aware that a solid cast metal bed-plate for paper-mill engines has been made, having a series of diamond-shaped knives upon its surface; but such bed-plate is objectionable from its liability to breakage, and the difficulty of repairing it when once injured or broken at any point.

We do not, therefore, claim such device, or any improvement upon solid cast metal bed-plates.

But we claim a bed-plate composed of sheet metal knives, corrugated, or formed with a series of angles or curved lines through their entire length, in the manner described, for the purpose specified.

RAILROAD CHAIRS—D. W. Crocker, of Deposit, N. Y.: I do not claim the longitudinal division of the chair, nor the use of a key passing through the chair.

But I claim the arrangement and combination, substantially as shown and described, of the inclined grooves, c c, key, c, jaws, B, and rail, A, so that the weight of the cars will depress the base parts, a a, of the chair, and thereby cause the jaw parts, b, to gripe the rail, A, more firmly.

[This invention consists in a novel method of applying a key in combination with a railroad chair, which is divided centrally into two parts, whereby the weight of the engines and cars passing over the track is made to draw the jaws of the chair towards each other, and make them clamp the sides, bases, and lower portions of the heads of the rails at their joints very closely, and thus prevent any displacement of the ends.]

FIELD FENCE—Daniel S. Curtiss, of Madison, Wis.: I claim the mode of notching the ends of the rails, and keying together the ends of the panels in the manner and for the purpose described and set forth.

CORN HUSKERS—Abbot R. Davis, of East Cambridge, Mass.: I claim the combination of the rolls, B and C, spring board, D, slotted projection, K, and conical projection, J, when these several parts are constructed and arranged for operation in the manner described, and for the purpose specified.

SUGAR CANE MILLS—William T. Dennis, of Richmond, Ind.: I claim the platiug or covering of the iron roller of sugar cane mills with tin, or other anti-corrosive metal or substance, for the uses and purposes described.

CONSTRUCTION OF POSTS FOR FIELD FENCES—John Drown, of Huron, N. Y.: I claim the arrangement of the braces, C C, one fixed and the other hinged or pivoted thereto, in combination with the rails, A A, and chair, B, substantially as specified.

HYDRAULIC PRESS—Richard Dudgeon, of New York City: I claim the described hydraulic press, consisting of the injection piston, A, chambers, B and C, and ram, D, the whole constructed and operating substantially as and for the purposes set forth.

SHOE HORNS—Daniel E. Eaton, of Boston, Mass.: I am aware of the invention set forth in No. 11,445 of United States Patents, whereby a spring clamp, with a concave holding jaw, is claimed in combination with a shoe slip or shoe horn; I make no use of any such spring clamp, or one which, when the shoe slip, or horn, is applied to the heel of a shoe and the shoe is being drawn on the foot by a pull on the instrument, maintains its hold on the shoe by the action of a spring. In my improved instrument, the hold of the nipper jaw on the shoe is obtained by the grasp of a person's hand during the act of drawing the shoe on his foot. The greater the resistance of the shoe the stronger will be the grasp of the nipper jaw, the spring serving to open the jaws; or in other words, to force the nipper jaw away from the shoe horn. This results from the peculiar application of the jaws to crossed levers. An upward pull on a spring clamp, such as is represented in the said patent, tends to lessen its hold on the shoe. So an upward pull on the spring clamp shoe slip, when the upper parts of the slip and its spring clamp are grasped by the hand a person, operates to loosen the hold of the clamp on the shoe. In view, therefore, of the invention as described in the said patent, I do not claim a shoe slip, or horn, having a holding jaw forced against the slip, or horn, by a spring.

What I claim, therefore, is the improved shoe horn, as made with a heel guide and nipper jaw, applied to two crossed levers, and so as to operate together substantially as specified.

IRON BRIDGES—Lewis Eikenberry, of Easton, Pa.: I claim, first, Having the uprights and diagonals of the side formings of the bridge so united together that they shall be capable of turning on their points of connection, and thus, whenever expansion or contraction in the metal occurs, they may be able to compensate therefor without ceasing to brace the bridge at top and bottom substantially as and for the purposes set forth.

Second, The combination of lattice side frames of bridges, formed of diagonal braces and angle iron uprights, which are united together, so as to turn on their points of connection, as above stated, with tubular, semi-tubular, or angle iron arches, substantially as and for the purposes set forth.

COFFEE POTS—W. H. Elliot, of Plattsburgh, N. Y.: I do not claim condensing the vapor of coffee so as to prevent the aroma from passing off, independent of the peculiar devices, and the method of employing them as set forth.

But I claim, first, The combination of boiler, a, stillworm condenser, b, conducting or discharge tube, g, the external opening of the stillworm at g, when these devices are so arranged in relation to each other that an opening to the external air shall be provided for the non-condensable gases, while the condensable vapors are reduced to a liquid without coming in contact with the condenser water, and then turned by conductors into the boiler, as and for the purpose specified.

Second, The arrangement of the joint, c, below the spout, so that no vapor can pass through the spout without first passing the joint as set forth.

Third, The employment of conductors in combination with the condenser for the purpose of filling the water-joint or keeping it full, as and for the purpose specified.

TANNING—Lewis C. England, of Owego, N. Y.: I claim, first, applying the liquor to the bark while said bark is being discharged from the mill for the two-fold purpose of making it a conveyor of the same, and a preserver of the dust thereof, as set forth.

I claim, second, The method of applying the heated liquor to the bark, for the purposes and in the manner substantially as set forth.

THRESHING MACHINES—Jno. B. Ford, Addison Sullivan, and Albert Gregg, of New Albany, Ind.: We claim the combination of the cutting cylinders, A A, provided with knives, the cylinder, C, and concave, B, provided with teeth, the screens, D, and the fan, E, substantially in the manner specified and for the purpose set forth.

SEWING MACHINES—Wm. A. Fosket and Elliot Savage, of Meriden, Conn.: We claim the feeding device, constructed and arranged, substantially as set forth, and so operating as to cause the cloth to progress by grasping the same with a positive force, in contradistinction to the employment of spring pressure, between two surfaces moving in unison while feeding.

We also claim setting the shank of the revolving and reciprocating looping hook at an angle to the bed-plate, substantially as specified, when said looping hook is constructed in the manner hercin described or referred to, for the purpose of avoiding motion of the said hook in the direction of the axis of revolution.

We also claim operating the slide-plate, O, from above the sewing table by means of a feed-foot having two motions—one vibratory in the line of feed, the other reciprocatory and perpendicular to the table or thereabouts.

SMUT MILLS—Carl Frank, of Cleveland, Ohio: I claim arranging between the trough, C, containing the grain to be scoured and the scouring cylinder, K, a slotted hollow cylinder, d, revolving within another hollow cylinder, e, as described.

HORSE POWERS—John Frezer, of Newberry, Pa.: I claim the combination of the flange, A, upon the end of the sweep-shaft, with the groove in the collar, R, or its equivalent, for securing the shaft, J, against the longitudinal motion, as set forth, in connection with the wheel, H, and pinion, M, attached to the sweep-shaft and the stationary wheel and pinion, L and M, which keep the shaft, J, in a directly radial position.

COMBINED CHAIR AND LOUNGE—F. J. Gardner, of Washington, N. C.: I do not claim, broadly, irrespective of construction and arrangement, an adjustable chair, or a combined rocking-chair and lounge, for such devices are in common use and arranged in various ways.

But I claim the seat, A, back, B, and supplemental back, C, connected together by joints, and provided, respectively, with the legs, d d, arms, E E, and rockers, D D, the whole being arranged substantially as and for the purpose set forth.

[This invention consists in a novel manner of constructing and arranging the several parts of the device so that they may be readily adjusted, so as to form either a rocking-chair or recumbent stationary chair, or lounge, as may be desired. The object of the invention is to obtain the desired end by a very simple and economical means, so as to lead to a very general adoption of them.]

LANTERNS—Conrad Gersten, of Brooklyn, N. Y.: I claim the mode of controlling the currents of air which feed the flame, by taking the air from the top of the lantern and causing it to pass down in a narrow annular passage to the apertures leading to the burner, substantially as described, in combination with the deflector which encloses the burner chamber, substantially as described.

I also claim, in combination with a lantern in which the flame is protected against disturbing causes outside, substantially as described, the arrangement, substantially as described, for controlling the wick from outside the lantern, as described.

I also claim, combining with the burner and the oil reservoir, and interposed between the two, an air chamber for preventing the oil from being overheated, as described.

BORING MACHINE—E. A. Goodes, of Philadelphia, Pa.: I claim, first, The adjustable worm, H, attached to its shaft, D, and arranged substantially as and for the purpose set forth.

Second, The gauge plate, E, attached to the bow, F, in connection with the index, q, on the mandrel c, for the purpose specified.

Third, The arrangement of the tube, j, on the shaft, k, pinion, l', on said shaft, the pulley, l, on the tube, j, and also the pinion, i, and the rack h, on the mandrel, c, substantially as and for the purpose set forth.

[The feed of this drill may be changed to modify the motion of the drill either quicker or slower, and the tool can be prevented from entering the work beyond a certain depth, and the tool can also be "gigged" back rapidly after it has bored the hole.]

HEMP BRAKES—John Hindman, of Haynesville, Mo.: I am aware that reciprocating beaters have long been used for breaking hemp, and I therefore do not claim, broadly, such device.

But I claim the reciprocating beater, D, stationary bar, E, and reel, F, combined and arranged to operate substantially as and for the purpose set forth.

[This is a superior hemp dresser, in which the woody core of the stems is taken and separated from the external fibrous sheath, and the latter is discharged from the machine in a perfectly smooth, and even, or disentangled state.]

SCREW PROPELLER—Augustus Jouan, of San Francisco, Cal.: I claim combining with the rigid blades of a propeller, an elastic blade, substantially as described.

MACHINE FOR SAWING WINDING FORMS—John C. Hitz, of Cincinnati, O.: I claim, first, In the described combination with one or more shifting supports or rests, the rocking bench, J, suspended at or near its windwith, by journals, j, and provided with suitable feeding and canting mechanism, substantially as set forth.

Second, In the described connection with a carriage, E, and crane, D, and with a rocking bench, J, having the described or equivalent feeding or canting mechanism, I claim the vibratory and arched rest, F, armed with spikes, f, the whole being arranged and operating substantially as set forth.

Third, In the described combination with a rocking rest, J, and speroidal feed roller, B, I claim the pointer, S s, adjustable in height, and having the described automatic retrograde motion, so as to indicate on the top of the slab the relative position of the bottom of the kerf, as set forth.

Fourth, In the described combination with the rocking bench, J, I claim the prying lever, D, constructed and operating substantially as set forth.

METHOD OF EXTRACTING OIL FROM COAL—E. N. Horner, of New Brighton, Pa.: I claim the use of a mixture of cream of tartar, common salt and slaked lime, for the purpose or condensing the oleaginous vapor produced by the dry distillation of coal, shale, or other bituminous minerals, extracting the oil from the gas and depriving the gas of its inflammable quality, and throwing off the sulphurous vapor, in the manner described.

WASHING MACHINE—Benj. Illingsworth, of Freeport, Ill.: I claim, as an improved article of manufacture, a washing machine, having a tilting box, B, cylinder, D, spring tollers, f j, and otherwise constructed as shown and described,

[A rotating cylinder is encompassed by a series o smaller pressure cylinders which are fitted within a suitable case, the upper part of which is connected to the lower part by hinges or joints; the cylinder case being placed in a box which is fitted in a frame, and the box rendered adjustable by means of a lever or an equivalent device; the whole being so arranged that clothes may be washed by it a very perfect manner.]

LAMPS—Richard Jenkins, of Covington, Ky.: I am aware that lamp caps have been so constructed that currents of air are kept circulating about and through the base of the flame, therefore I do not claim this arrangement.

But I claim the combination of the inner and outer cones when arranged in relation to the wick tube and each other, substantially as specified, and supplied with air or oxygen, for the purpose of maintaining a perfect combustion of the heavier gases or matter arising, by capillary attraction, in the space or chamber existing between the cones, and thus producing, with coal oil, a brilliant flame, with very little, if any, blue appearance at its base above the outer cone, substantially as set forth.

MACHINES FOR MAKING CLAY PIPES—John Jones, of Baltimore, Md.: I do not claim the manufacture of pipe of two sizes, as various devices of molds have been used for that purpose.

But I claim a two-sized permanent core or mandrel, in combination with the fixed die, A, and adjustable jaws, C D, constructed, arranged and operating in the manner described for the purpose specified.

APPARATUS FOR EVAPORATING SUGAR JUICE—Augustus Jouan, of San Francisco, Cal.: I claim the floating cover, applied to the evaporation of saccharine liquids or for concentrating heat for other purposes, constructed, arranged and operated substantially as set forth.

METHOD OF BLOWING-OFF STEAM BOILERS—James H. Washington, of Baltimore, Md.: I claim connecting the pipe, C, by an elastic or yielding joint, to the stationary pipe, B, and furnishing its opposite end with a float, D, that will keep the inlet into said pipe, C, at or a little below the surface of the water in the boiler, so as to blow off sediment, &c., at the surface, however much it may rise or fall, or vary, substantially as described.

FURNACES FOR DISTILLING ZINC—Samuel Wetherill, of Bethlehem, Pa.: I claim the employment of vertical retorts with movable caps at top and movable cups at bottom, substantially as described, in combination with the fire chamber of a furnace, and suitable chambers for the circulation of heat, substantially as described, when applied to the reduction of ores of zinc to the metallic state, as set forth.

I also claim, in combination with retorts for the reduction of the ores of zinc to the metallic state, the mode of mounting the vertical retorts, by having them sustained by their lower ends resting in suitable sockets, substantially as described, and unconfined at their upper ends, whereby they are free to yield to unequal expansion, as set forth.

I also claim, in combination with retorts for the reduction of the ores of zinc to the metallic state, the employment of two fires with separated ash pits, substantially as described, whereby the fires can be separately cleansed and stocked, to admit of applying a continuous heat to the retorts, as set forth.

I also claim, in combination with vertical retorts for the reduction of the ores of zinc to the metallic state, the employment of perforated central tubes, substantially as described, for the discharge of the metallic vapors from the charge, and the condensation thereof to the metallic state, as described.

And I also claim the combination of the vertical retorts, the perforated central tubes, and the movable cups and appendages at the bottom, and the movable caps at the top, substantially as described, all concurring in the more ready changing of the retorts, the working of the charge, the escape and condensation of the metallic vapor to the metallic state, and the delivery thereof, and the discharge of the residuum from the retorts, and the re-charging of them, as set forth.

BOAT FOR TRANSPORTING RAILROAD CARS—Jesse Wheelock, of Lancaster, N. Y.: First, I claim the arrangement of the ropes or chains, Y, pulleys, Z, and timbers, C, when applied to each end of the boat, for the purpose of holding the boat steady at the bow and stern while the cars are being transferred to or from the boat, the whole constructed and operated substantially as set forth.

Second, I claim the arrangement of the bumper dock, A', relatively to the dock, A, and slip, F, for the purpose of arresting the headway of the boat, and allowing it to be drawn sidewise into the slip, F, so that the track which runs lengthwise of the boat may be brought into line with the suspended track, as described.

Third, I claim the combination of the suspended track with or without the short portion, N, with the track on the boat, for the purpose of conveniently transferring the cars to or from the boat, at whatever hight the boat may stand in the water, substantially as described.

HEATING APPARATUS—George W. Williamson, of Scranton, Pa.: I do not claim dampers or their equivalent in my invention.

Neither do I claim a stationary flat plate, or a series of them, with an opening around the outer edge for a draft passage.

Neither do I claim to be the inventor of a combustion chamber.

But I claim the application to fire chambers or smoke flues of a double series of plates, when the same are constructed, combined, and arranged in the manner and for the purpose set forth.

ROTARY PUMP—George Wingate, of Philadelphia, Pa.: I claim the revolving bucket wheel with any suitable number of pistons, operated by the cam, R, in combination with the exterior casing, B, its chambers and partitions, the whole being arranged for joint action substantially as and for the purpose set forth.

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WASHING MACHINE—George W. Wilson and Andrew Johnson, of Walnut Grove, Ill.: We claim as an improved article of manufacture a washing machine, having upon the central cylinder, C, a plate, g, arms, h h, curved slats, j, and rod. i, for securing the clothes, and in the upper part of the cover, B, a rubbing device, D, consisting of a slat, m, with slats or corrugations, o, at its sides, and rollers, p, and otherwise constructed as shown and described.

[This invention consists in the employment of a rotating cylinder, stationary rubber, and a cleaner placed within a suitable case or box, and combined and arranged so as to act in a very efficient manner on the clothes, for the purpose of cleansing them without injury.]

VALVE GEAR OF OSCILLATING STEAM ENGINES—Herman Winter, of New York City: I claim, first, The method substantially as specified of causing a shaft by means of which the valves of an engine are moved to revolve through the agency of a cam, a lever and a crank, and the oscillation of the cylinder to which the shaft is attached, all the parts being substantially such as specified, and acting in combination, substantially in the manner specified.

Second, I claim the combination of a toe keyed to some rod, which actuates a valve or valves, with an adjustable swinging toe and a revolving cam, the combination being substantially such as set forth, to serve the purpose described.

WASHING MACHINE—George L. Witsil, of Wilmington, Del.: I do not claim the shape of the tub.

Nor do I claim the corrugated surfaces.

Neither do I claim the passing the clothes between the two surfaces, one being a cylinder, and the other the surface of the tub, for I am aware that the ribbed surfaces have been used long since, and that V. R. Stewart has already (June 28, 1856) patented a machine having a ribbed cylinder revolving in proximity to a concave board, between which the articles in washing pass.

But I claim the combination of the corrugated or fluted conical cylinder, placed vertically with the corrugated or fluted sides of the conical tube, arranged and operated as shown and described, for the purpose specified.

PROCESS FOR DECOMPOSING FATS—Robert A. Wright and Louis J. Fouche, of Paris, France: We do not claim the application of superheated water for decomposing fatty bodies, nor the form of the apparatus divided, which may vary somewhat according to conditions and circumstances.

But we claim producing a continuous automatic circulation of highly heated water in a very finely described state through the bodies under treatment by means of an apparatus constructed and employed substantially as shown and described.

BOOT JACK—William D. Young, of Baltimore, Md.: I claim the construction of a boot jack substantially as set forth, when used in combination with a chair, as described.

CLOTHES FRAME—Daniel C. Colby, of Keene, N. H., assignor to himself and Daniel W. Ransom, of Croydon, N. H.: I claim the arrangement of the levers, D E and F, as above described, in combination with the pawl, K, and the shaft, G, operating substantially as set forth,

DRAWING FRAMES FOR FIBROUS MATERIALS—Silas C. Durgin, of Holyoke, Mass., assignor to himself and Ammon R. Durgin, of Nashua, N. H.: I claim the arrangement of the conical draft rollers between the gage trumpet and the other reducing rollers, and supporting such trumpet by a mechanism essentially as described, or the equivalents therefor, which will enable the said trumpet to operate both as a gage to the sliver and to guide it to the rollers, and to be vibrated with regard to the conical rollers, in manner and for the purpose as explained.

I also claim the combination of mechanism for supporting and vibrating the trumpet, the same consisting of the bent lever, E', the overbalance carrying lever, F, and the stationary stud, and when such combination of mechanism is employed in manner and for the purpose described.

I claim the arrangement of the supporting arm, g, of the weight, h, above the fulcrum of the lever, F, in manner as and to operate with reference to the lateral dreg of the sliver on the trumpet as specified.

KNITTING MACHINES—Jonathan Filler and Joseph Bullock, of Cohoes, N. Y., assignors to Wm. Smith, of Albany, N. Y.: We do not claim a slide operating by a bent arm at one end to enter breaches in the fabric, and at the other by moving a ring which is attached to and operates it to shift a coupling apparatus.

But we claim the apparatus attached to the stop carriage—viz., the combination of the slides, H and G, parol, E, gage, i, and arm, m, operating together upon the breaking of the fabric to uncouple the driving powers by and in combination with the ring, R, pin, J, and spring, d, which release the detent, V, substantially in the manner and for the purposes set forth in the specification.

TELEGRAPHIC MACHINES—David E. Hughes, (assignor to the American Telegraph Company,) of New York City: I claim, first, giving to the key, while still pressed by the operator, a second motion at the instant that the circuit is closed or broken, as the case may be, so that an indication of said closing or breaking will be given to the operator, for the purposes set forth.

Second, The method described for governing the position of the letters upon the type-wheel with respect to that of the platen or roller over which the paper travels, in order to insure an exact position of my particular letter at the moment of printing the same—viz., by so advancing or retarding the said type-wheel upon its shaft, whenever it has lost or gained in time in regard to the travel of the circuit breaker at the distant station, that the letter indicated will be certain to stand directly over the said platen at the movement the latter brings the platen into contact with said letters.

Thirdly, Effecting the printing of each letter without arresting the motion of the type-wheel, by causing the platen to revolve in the same direction and with the same speed as the type-wheel, while said platen is bringing up and holding the paper in contact, whereby the paper is advanced along with the type or letter from which it is receiving an impression.

Fourth, The devices by which the type-wheel is started from its zero, by an operator at a distant station, consisting of the shaft, g, set in motion by the electric current, and acting in combination with the clutch lever, n, and the wheel, E, whereby the type-wheel will be advanced up to the time that it becomes engaged with its driving shaft, substantially as set forth.

ELECTRO-BATHING APPARATUS—Wm. W. Karshner, of Cincinnati, O.: I do not wish to be understood as broadly claiming the insulating of a patient for the purpose of electro-medical treatment.

But I claim, first, The suspending non-conductor bands, f f f f, the conducting foot-plate, h, insulated from the bath-tub by the non-conducting substance, g, all substantially as set forth.

Second, I claim the combined use of the above described non-conducting bands, f f f f, the conducting foot-piece, h, and the non-conducting substance, g, or their equivalents, for the purpose of administering an electric bath for therapeutic purposes, as described.

REVIVIFICATION OF BONE BLACK—Henry Kattenhorn, of New York City: I claim the method of washing bone black, or animal charcoal, in the purifying of sugar, substantially as described.

KNITTING MACHINES—Chauncey G. Keeny, of Manchester, Conn.: I claim the employment of a card attachment to knitting machines, substantially in the manner and for the purpose as described.

MARINE STEAM ENGINES—Wm. Kennish, Jr., of New York City: I claim the application of an auxiliary pipe to the present discharge pipe of a marine steam engine, in the manner and for the purpose described in the specification.

MACHINE FOR CUTTING AND SETTING SAW TEETH—Columbia G. Loynes, of Lenox, Mass.: I claim the devices for punching and shearing metals, as described, arranged in connection with the saw-gummer and saw-set, the whole constructed and operating in the manner set forth.

MACHINERY FOR SCUTCHING FLAX—Wm. C. McBride, of Raritan, N. J. Patented in England May 20, 1856: I do not claim either set of feeders, separately, as making part of my present invention, having described a similar arrangement in Letters Patent granted to me by the government of Great Britain in the year 1852.

What I claim is, the mode of operation of the combined rotating blades or beaters, with the interposed stocks, substantially as described.

I also claim combining two scutching machines, substantially such as described, or equivalents thereof, by means of the two feeding wheels, with their bands, arranged substantially as described, for transferring the fibers which have been scutched at one end, that the other end may be properly presented to the second scutcher, as set forth.

I also claim, in combination with the two sets of feeding bands and wheels, or their equivalents, the sustaining and guiding table, substantially as described, by which the upper unscutched ends of the fiber are held up, guided, and properly presented to the second scutcher, as set forth.

MANUFACTURE OF CANDLES—Antonio Meucci (assignor to D. B. Loraine), of Clifton, N. Y.: I am aware that molds of plaster of Paris, or other porous materials, partially or wholly saturated with grease, have been used in the manufacture of articles of plaster of Paris, and other ornamental objects, and therefore do not claim the invention of such molds, or their employment in other arts.

But I claim the method of forming mold candles in saturated porous candle molds, substantially as set forth, in contra-distinction to the method in general use of forming them in candle molds of impervious metal.

HEATING APPARATUS—U. D. Mihills, of Hartford, Wis.: I claim a heat controlling cylinder, in which the regulating disks, shaped as described, are connected with a detachable frame, the same being arranged and operated as specified.

WASHING MACHINE—Wm. H. Milhouse, of Sugar Town, Pa.: I claim, first, Securing strips of india-rubber edgewise in slots in the concave, D, and rubber, E, by means of the slots which are bolted in between the successive strips, as fully set forth.

Second, The arrangement of the adjustable frame, F, levers, a and b, swinging rubber, E, pitman, D, and shaft, e, with the concave, when the whole are combined, constructed and operated in the manner and for the purpose set forth.

BED BOTTOM—B. F. S. Monroe, of Utica, N. Y.: I claim the two frames, A C, with the spring, B, secured between them, the frames being connected by the cross bands, F, covered or enclosed by any suitable fabric, E, and the upper frame supporting the seat or mattress, the whole being arranged substantially as and for the purpose set forth.

[The object of this invention is to allow the outermost rows of springs in a bed bottom, chair seat or other article in which they may be placed, equal freedom of movement with the innermost springs without lateral play, so that each spring will be permitted to bear its proportion of weight, and while being kept in proper position allowed to yield or give to the full extent of its movement, thereby rendering the article in which they are placed far more elastic, durable, and altogether more desirable in ever respect than those hitherto constructed.]

PUMPS—Walter Peck, of Rockford, Ill.: I am aware that hollow plungers have been made and do not wish to be understood as laying any claim thereto.

But what I claim is the combined arrangement of the stationary standard, c, vibrating lever, a, and lifting spring, b, with the plunger, A, as specified, for the purposes set forth.

I also claim the combined arrangement of the hollow plunger, A, having a cylinder, C, and spout, f, and attached directly to the handle, with the stationary chamber, D, and steadying springs, B, as specified.

COMBINED PUNCH AND AWL—F. P. Pfleghar, of Whitneyville, Conn.: I do not claim a plurality of cutter tubes, d, of different sizes attached to a rotating head, b, for the purpose of punching holes of different sizes, for such device, or its equivalent, has been previously used.

But I claim the rotating hollow head, b, provided with a series of cutter tubes, d, of different sizes, in combination with the awl, h, attached to or forming a part of the bent bar or rod, E, which, as well as the head, b, is attached to the jaw, c, and provided with a spring plate or stop, m, the whole being arranged substantially as and for the purpose set forth.

[Where belts are used, as in mills, machine shops, &c., it is often necessary to sew together their ends when they become broken or separated while driving the machinery. This invention facilitates this, and is also applicable for other purposes where leather or any fabric is punched, and laces passed through for the purpose of holding the ends together. The invention consists in combining a rotating punch stock with an awl in such a manner as to perform the desired work.]

TWISTING FIBROUS SUBSTANCES—George W. Pittman, of Bushwick, N. Y.: I claim the application of the flyer, B, or its equivalent, substantially as described, in combination with the rollers, D D', and spool, F, or other equivalent means of holding the sliver, and taking up the twist produced by the flyer, whereby the same operation is made to spin the sliver into yarn, and twist the same with one or more other yarns, simultaneously as set forth.

[This invention consists in a certain mode of applying a flyer, or its equivalent, in combination with other mechanism, whereby it is made to spin a sliver or roving, and by the same operation to twist the yarn thus produced a ong with one or more yarns or threads which have been previously spun, and by that means saving half the mechanism commonly employed and half the time usually occupied in the spinning operation for the manufacture of twist. The invention is applicable either in the production of strands for rope or for cotton, woolen or silk twist for all purposes.]

RAZOR STROPS—Michael Posz, of Shelbyville, Ind.: I claim, as a new article of manufacture, the self-lubricating razor strop, when constructed in the manner described.

BELT TRUSSES—H. H. Reynolds, of Buffalo, N. Y.: I claim the combination of the T-spring, E, with the conical spring, H, pad, B, belt, A, and perineal strap, C, the whole being arranged substantia ly as shown.

STOVES—Philip Shreiner, of Columbia, Pa.: I claim the air-supplying tubes and air-heating cylinders, when combined with a stove, the heat of which is unobstructed by outside casings.

PHOTOGRAPHIC PLATE VICES—M. M. Rison, of Paris, Tenn.: I do not claim the use of an adjustable jaw and a clamping jaw, the former stopped by a pawl working in a ratchet in the bed-piece, and the latter operated by an eccentric attached to the bed-piece.

But I claim, as an improved article of manufacture, a photograph vise, having its eccentric lever, E, provided with a groove, g, a clamping jaw, D, provided with a catch, f, to engage g, a jaw, C, provided with a spring pawl, which engages a rack, e, and otherwise constructed as shown and described.

[This invention consists in the application of a grooved or hooked eccentric lever to operate upon one jaw of a photographic plate vise, in combination with a spring pawl attached to the other jaw to operate in a toothed ratchet on the bed-piece, for the purpose of permitting the adjustment of the vise to the plates of different sizes, and the speedy clamping and release of the plates.]

WAGON BRAKE—Daniel Robinson, of Lenox, Pa.: I claim the combination and arrangement of the sliding frame, F, curved bars, C, attached to the rock-shafts, D D, and passing through the traverse bars, d, of the frame, F, and the shoes, E, attached to the ends of the rock-shafts, the several parts being fitted in the truck, or bed, A, substantially as and for the purpose set forth.

[Shoes are attached to rock-shafts which are fitted in the bed or track of the vehicle, and having curved bars attached to these rock-shafts, the bars passing through a sliding frame fitted in the bed or truck, and having the draft pole attached to it. The brake is operated by the momentum of the vehicle when the speed of the same is checked, or by gravity alone when descending a hill. It is applicable to all wheel vehicles.]

MACHINE FOR SPLITTING WOOD—P. P. Ruger, of New York City: I claim the spring or yielding guide for relieving the cross bars, e, in the manner specified and for the purposes set forth.

I also claim the guide plate, x, with the uprights, y, constructed and arranged in combination with the wood splitters, as specified.

BALL FURNITURE CASTERS—B. A. Russell, of Deep River, Conn.; I claim a new article of manufacture, in my improved furniture caster, when composed of cylinder or casing, A, either with or without the radial set screws, G, or ribs, G', in combination with the plate, D, and ball, F, when constructed, arranged and operated in the manner and for the purposes set forth.

BREECH-LOADING FIREARMS—Christian Sharps, of Philadelphia: I claim, first, Forming on the outer end of the sliding bush, G, as the sole bearing point against the breech, an annular inclined projection with a sharp annular edge, b, coinciding with the smallest portion of the bore of the said bush, as and for the purpose set forth.

Second, The annular termination, e, of the sliding bush fitting into an annular recess, d, formed in the barrel and overlapped by the sharp-edged annular projection, substantially as set forth and for the purpose specified.

Third, The convex base, n, as fitted into a concave socket in the breech, so as to form a self-adjusting base for the end of the barrel.

BREECH-LOADING REPEATING FIREARMS—Christian Sharps, of Philadelphia, Pa.: I do not desire to confine myself to the use of a barrel block with four bores, or to the precise devices described, for altering the position of the projection, S, inasmuch as a barrel block, with more or less than four bores, may be used in connection with my improvement, and as different devices for changing the position of the said projection.

But I claim first, Exploding, in succession, a number of cartridges of the class described by means of a projection caused to revolve by the movements of the hammer, when the said cartridges are so arranged, in respect to the said projection, that the latter shall strike the edge only of each cartridge in succession, as set forth.

Second, The catches, t t, so arranged on the stock, in respect to the bores of the barrel block, that on moving the latter from the breech, they may be the means of withdrawing the whole of the cartridges simultaneously from their respective bores, as set forth.

BOOT HEELS—Stillman Thorp, of Portland, Me., and Wesley Thorp, of Turner, Me.: We do not claim an elastic metalic spring or plate applied in the shank of a boat, nor do we claim a rotary heel-piece applied separately from the metallic shank piece, as we are aware that neither is new.

But we claim the combination of the metallic plate spring or shank stiffener. and the rotary heel-piece, connected together and applied to the heel and shank of a boot or shoe, substantially as specified.

WASHING MACHINE—Wm. B. Twiford, of Chincoteague, Va.: I claim the opposing incline planes, e e, on the underside of the ends of the sliding roller frame E, in combination with fixed concave projections or ledges, c c, on the sides of the tub or box, and with grooves, B, of greater width than the diameter of the journals of the roller, in the sides of the box, substantially as and for the purposes set forth.

LAMPS—Hezekiah Knowles, of New London, Conn., assignor to Fellows, Hoffman & Co., of New York City: I do not claim, separately, either of the deflectors described, nor the introduction of a current of air at the base of the chimney and between it and the upper deflector.

But I claim the lower or diaphragm reflector surrounding the wick tube at or near its upper edge, substantially as and for the purpose specified, in combination with the upper deflector and the chimney, having suitable openings for the supply of a draught of air to the inside and to feed the flame outside of the upper deflector, substantially as and for the purpose specified.

HARVESTERS—Geo. W. Richardson and Robt. Glover, of Grayville, Ill., assignor to themselves, J. B. Williams and Wm. A. Horrall, of White county, Ill.: We claim, first, The jointed spring arm, a'', arranged and operating in the manner and for the purposes set forth, in combination with the spring catch, i i', operating so as to catch and hold the arm, a'', when it has gathered the grain, and retain it in this position until the bundle is ready to be deposited free from the platform, p.

Second, The raker, a a' a'', in combination with the rod, r, crank, c, rest, n'', and retracting weight, w, arranged and operating to produce the reciprocating movements for gathering and delivering the gavel in the manner described.

Third, In combination wish the arm, a'', the connecting rod, m, and bent lever, l, operated through the medium of rod, n n', pin, n'', and rest, n''', by the driving wheel, C, substantially in the manner and for the purposes set forth.

RE-ISSUE.

RECLINING CHAIRS—Augustus Eliars, of Boston, Mass. Patented May 11, 1858: I claim, first, The general arrangement of devices described for actuating and sustaining both the back and foot-rest, the same consisting of the arms, f f', attached to the back in a projection thereof, and having a shaft which travels in grooves, formed in the supporting frame-work of the chair and the arms, the whole being combined with the foot-rest and frame as set forth.

Second, I claim the combination of device described, whereby the back can be placed and held in any desired position and at same time the proper length of arms retained, the same consisting of the hinged rails, p p, sliding arms, s s, locked upon said rails in any desirable manner, and mortises to receive the said rails as set forth.

Thirdly, I claim the foot-rest, constructed and arranged substantially as described, when combined with a spring or weight, or its equivalent, to operate as set forth, so that the said foot-rest may be raised or lowered at will, to adapt itself to the length of the limb of the occupant, substantially as described.

Fourth, In combination with a reclining chair, constructed as described, I claim the peculiar joint between the back and arms, consisting of the arm, g', attached to the back, and turning upon a pivot in the groove or mortised sliding arm, whereby a very long arm may be obtained, as set forth.

HULLS OF STEAM VESSELS—Ross & Thos. Winans, of Baltimore, Md. Patented Oct. 26, 1858: We claim constructing the hull in the form of a spindle, substantially as described.

INVENTIONS EXAMINED at the Patent Office, and advice given as to the patentability of inventions, before the expense of an application is incurred. This service is carefully performed by Editors of this Journal, through their Branch Office at Washington, for the small fee of $5. A sketch and description of the invention only are wanted to enable them to make the examination. Address MUNN & COMPANY,
No. 37 Park-row, New York.

The Time to cut Timber.

MESSRS. EDITORS—In a recent number of the SCIENTIFIC AMERICAN, under the head of "Useful Information about Timber," I find a statement in direct opposition to the theory received among wood-cutters, in regard to the best time for felling timber. It is there stated that this is when the wood contains the *least sap*, in whatever part of the year this may take place. The result of my observations is that the month of August is the best period to cut timber for mechanical purposes, just when the leaf is full or has attained its growth, at which time the tree has certainly the greatest amount of sap in it. I have found that the timber cut at this period is perfectly solid, sap wood and all, and that it is also free from worms. Timber cut upon the same ground during other months of the year is quite porous, and has the sap wood entirely eaten off, when undergoing the same process in drying. I was led to believe that the abundance of sap in August closed the pores of the wood and solidified the timber. If my philosophy is wrong, there are quite a number of your patrons in this place interested in the subject, and who wish to hear more about it.

THOMAS HARPER.

Alleghany City, Pa., Jan., 1859.

[There seems to be a misapprehension of the idea expressed on page 154 of the present volume of the SCIENTIFIC AMERICAN, in regard to the best period for cutting timber. It is there stated that in New England, August is held to be the best month of the year, as at that period the *sap is exhausted* in forming the leaves and the new wood and the trunk are then much drier. This language is in accordance with the opinions of our correspondent. In reference to the term *least sap*, perhaps the matter would be rendered more clear to have said the least *free* sap. In the month of August, according to our correspondent, the sap becomes solid and fills up all the pores of the wood, consequently it is not *free*—not exactly sap at that period. In other States, further south, July is the month most favorable for cutting timber.

Winans' Steamer Again.

Life Illustrated publishes our remarks on this subject on page 137, this volume of the SCIENTIFIC AMERICAN, and, among other observations, says:—"We do not think that the device proposed for propelling the steamer will answer the purpose as well as some others that might be employed; and we believe we could give graver reasons for our opinions than any of those stated in the above (our) article." Surely, in the language of the "immortal poet," here is "wisdom, gravity, and profound conceit, as who should say 'I am Sir Oracle, and when I ope my mouth let no other dog bark.'" We respectfully call for these "graver reasons," for we hold it to be one of the common courtesies of life not to call in question the opinions of another upon a disputed point without at least *showing* the courage to express our own.

NEW OFFICE OF THE SCIENTIFIC AMERICAN.—Having removed our quarters, our friends are requested to address us as follows:
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New Inventions.

Distilling Asphaltum.

A patent has lately been taken out in England, by James Stuart, of Chatham, for obtaining oil and other products from asphaltum and other bituminous matters by grinding and mixing any of these substances with lime, or chalk, then distilling them. A larger and more pure product is stated to be obtained by this invention. In its nature it appears to be similar to that of Halvor Halverson, of Cambridge, Mass., in the distillation of resin oils, for which a patent was granted some years ago.

Artificial Whalebone.

R. Wappenstein, of Manchester, England, has received a patent for making artificial whalebone, in long strips, from the horns of animals. He first cuts the horn spirally, by this he obtains a long spiral from a comparatively short horn. After this, he heats the coiled strips and straightens them out with a machine, they are then submitted to severe hot pressure to make them retain their shape. These strips are colored and made to resemble whalebone suitable for umbrellas and crinolines.

New Telegraph.

The distinguished inventor of the stereoscope and of the first telegraph erected in England, Professor Wheatstone, of London, has just secured a patent for a recording telegraph, designed more exclusively, we understand, for ocean telegraphing. Its object is to use the positive and negative currents alternately, so as to obviate some of the evils of induction that prevent the rapid transmission of messages. He uses a perforated strip of paper to receive the records similar to that used by Bain in his large chemical telegraph. This strip is placed in connection with a rheomotor (or source of electric power) which, on being set in motion, causes it to move along and act on two pins in such a manner that, when one of them is elevated, the current of electricity is transmitted in one direction, and when the other is elevated, the current is transmitted in the opposite direction. These currents following each other, indifferently, in opposite directions, act upon the recording instrument at a distant station to produce corresponding marks on a strip of paper. Two recording pens are employed, and exact duration in the time of each signal is stated to be secured. The apparatus is quite complicated.

Improved Paddle-Wheel.

The great objections which can be brought against the paddle wheel as a means of propelling ships, this inventor—R. B. Locke, of Stapleton, Staten Island—has endeavored to remove by an improved arrangement of the buckets, and we must really say that he has been very successful. There is no concussion on the buckets entering the water, and the jarring or trembling, so unpleasant to passengers and injurious to the boat, is almost entirely avoided. The back water is obviated, as the paddles both enter and leave the water at an angle, though maintaining a firm hold upon it, while immersed, by their reversed position toward each other. As no water is lifted and carried up by the wheel, so there is no displacement caused behind it, and consequently no slip of the wheel. This wheel can be submerged to a greater depth, and worked in denser water than the common wheel. This last advantage is of great importance, as it not only accommodates ships heavily laden, but allows the shaft to be worked beneath the deck. It cannot well get clogged with ice or drift, and it is strong and durable, and easily repaired; and it has been proved by experiment to answer all that was expected of it.

Our illustrations fully explain the construction, Fig. 1 being a perspective view, Fig. 2 a separate view of one bucket or paddle, and Fig. 3 a top view, showing the arrangement of the paddles. To a hub or shaft, A, are secured a series of radial arms, B B′ B″, connected together by rims or peripheries, C C′ C″, and each of these arms, B, carry a bucket of a diamond-shape, E E′ E″, placed at the angle at which the bucket takes the water (as seen in Fig. 3). The four corners of each bucket is shaped into a

LOCKE'S IMPROVED PADDLE-WHEEL.

Fig. 1.

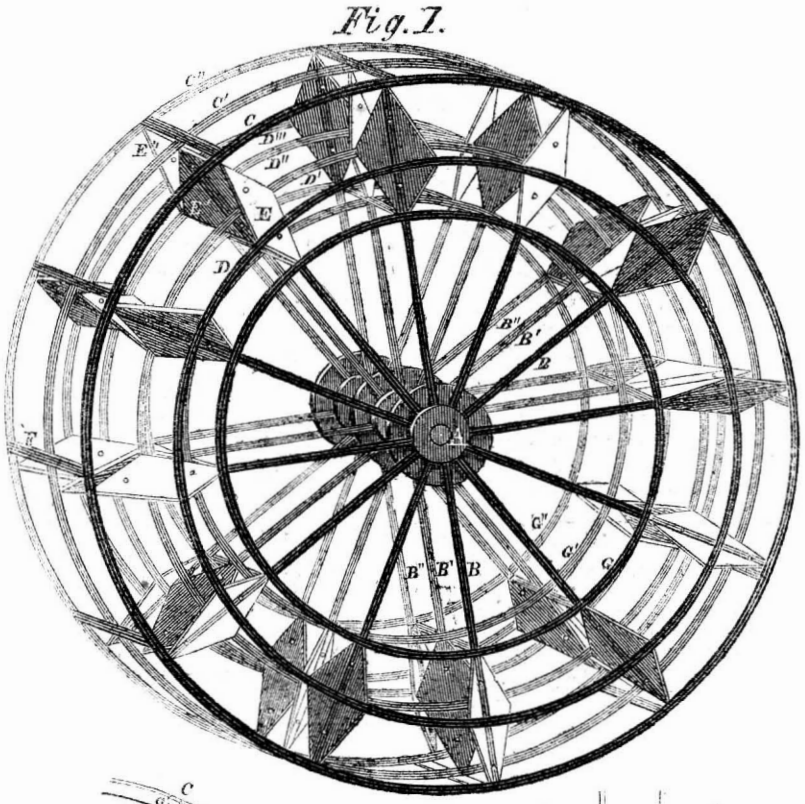


Fig. 2

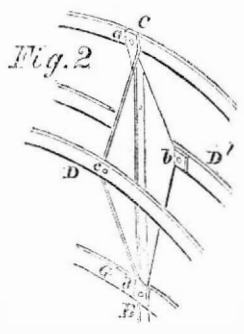
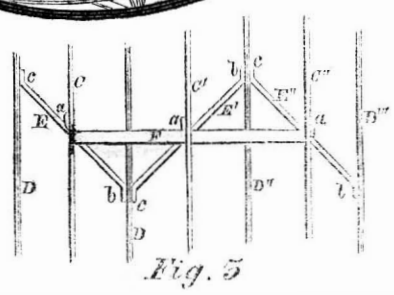


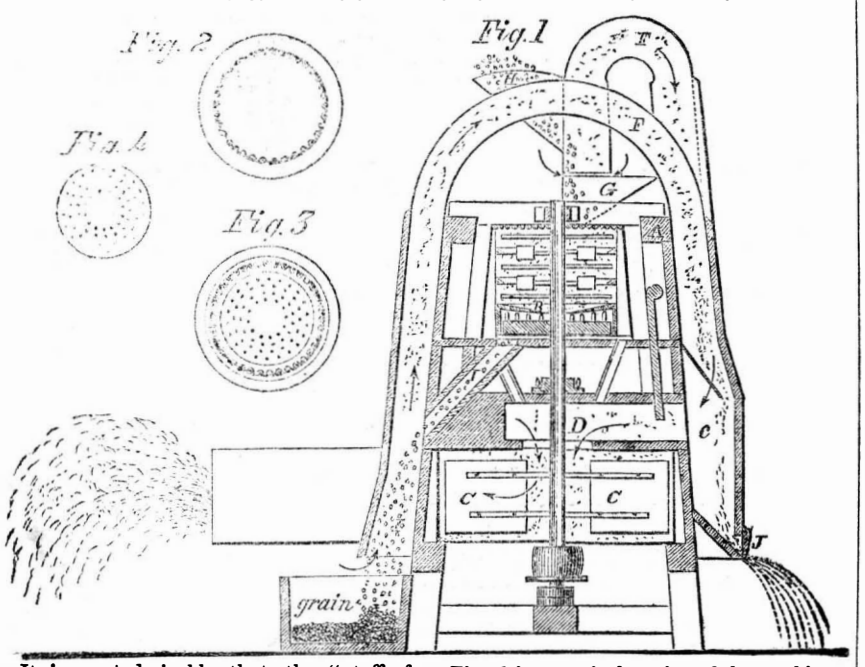
Fig. 5



lug, *a b c d*, Fig. 2, and by these lugs they are secured to central rims, D D′ D″ D‴, bottom rims, G G′ G″ and the outside rims, C C′ C″, which are stayed from any warp or twist by cross-ties, F. The whole may be constructed of iron or wood and the propelling effect is equal, no matter in what direction the wheel rotates.

It was patented October 26, 1858, and the inventor will be happy to furnish any further particulars upon being addressed as above.

LANTZ & RUSSELL'S SMUT MACHINE.



It is most desirable that the "staff of life" should be pure and free from adulteration of all kinds, and the machine which is the subject of our engraving is designed to clean the wheat and remove from it all filth; and at the same time, while it separates the dirt from the wheat that is to be used for bread, it also saves the defective grains of wheat or cheat for horse-feed, and cleans this from dust and cockle.

Fig. 1 is a vertical section of the machin e, Fig. 2 is a top view of the rubbing cylinder, Fig. 3 is a bottom view of the same, and Fig, 4 shows one of the rubbers.

The wheat is first passed through a small screen constructed with two riddles, H, which prevent anything larger than wheat passing into the machine, and the lower riddle allows all articles smaller than wheat to fall out of the machine. This hopper is moved by an eccentric, so that its motion riddles the grain. The wheat now passes into hopper, G, through the arch, F, where it is further cleaned by a blast of air passing to the fan, C. It is then conducted into the smut machine proper or rubbing cylinder, B. E is a draft arch into which the cleaned grain falls from B through the spout, I, where it meets with a suction draft passing to the fan. The smut balls, light grain, &c., that are separated from the wheat in F pass through F in the the direction of the arrows, and the light grain falls out at J, while the smut, &c., being separated at *c* passes through the tube, D, into the fan where it is blown away. The arrows indicate the direction of the draft. The whole machine is mounted on a stout frame, A, and is perfect in its operation. The addition of an extra tube is the novelty, in which the lighter grain hitherto blown away is saved and made of use, thus economizing all that is worth keeping of the wheat, and at the same time effecting a perfect separation. The whole of the motions are derived from the one shaft, the fan and rubbers being placed upon it.

It is the invention of J. Lantz and John Russell, of Wheeling, Va,, who may be addressed for further information. It was patented August 10, 1858, and is an excellent machine.

Water in Groups of Boilers.

We have just received a letter from H. H. Evart, of Cleveland, O., which was suggested by reading the article on page 145 of the present volume of the Scientific American, in reference to the water being at different levels in connected steam boilers. He informs us that, about two years ago, he set up an engine and two boilers side by side, connected in the usual manner by water and steam pipes. The steam pipe was too small, but as he was nearly 200 miles from the place where the engine was made, he concluded to try it. "When the engine was started, the water rose in the boiler nearest the engine and fell in the other until it was below the gages. On stopping the engine for a short time, the water soon rose in the back boiler to the same level as that in the other. This action afforded a good opportunity for experimenting as to the cause of this." As the water equalized itself when the engine was at rest, the difficulty became apparent as one in connection with the steam pressure, not the water arrangements, and it was suggested, that the difference of pressure in the two boilers must be the cause. When the hottest fire was made in the front boiler, so as to generate most steam, the boilers operated better; but when a stronger fire was kept in the back boiler, the water rose too high in the front one, and passed over into the cylinder so as to stop the engine. After making repeated trials always with the same results, a remedy was applied. This was a copper pipe placed so as to equalize the pressure in both boilers. After this, the water maintained the same level in each boiler, and no difficulty was experienced.

The cause of the evil was the small steam pipe, and is explained by our correspondent as follows:—

"Your readers will bear in mind that a column of water one inch square and a foot high weighs nearly half a pound; consequently, if the steam pipes are so constructed that, in supplying the engine, half a pound more pressure is required in one boiler than in the other, the water in one will soon sink about one foot below the level of that in the other. Such extreme cases are rare; but a difference in pressure of two ounces is not uncommon in a group of boilers, and this makes a difference of three inches in the water levels. One great danger in having small steam connections in groups of boilers arises from unequal firing under them; the one in which the fire is kept hottest always exhibits a lower water level."

The electric cable between France and Algeria does not work well.

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Scientific American.

NEW YORK, FEBRUARY 5, 1859.

Removal of the Scientific American Office.

The time is morning. A few rays of sunlight glide into our sanctum, and show it to be filled with clouds of dust; a noise of hammers, busy feet and bustling packers disturbs our quiet; and the fact is forced upon our attention that we are really *removing.*

"Farewell, a long farewell,"

we are tempted to say to the old walls and familiar floors, but not to those kind friends whose presence has made our office a pleasant place, and whose support and encouragement have attended us so far along the journey of life. Throughout *fourteen years* our business has been steadily increasing; but we have always "hailed" from the same old spot. Now, however, the SCIENTIFIC AMERICAN is changing its location.

We must confess it, we like the very office in which we sit, and regard with some amount of veneration the furniture and fittings, for they are the SCIENTIFIC AMERICAN'S *Lares* and *Penates*—its household gods. That feeling which is formed in every human being—the love of home—is in us broadened into the love of our office, for it has been the scene of all our professional labors, anxieties, and triumphs.

But we find that our old location is not large enough to accommodate our increasing business. We have endured the difficulties of insufficient space as long as we could—now compromising this little thing and then that—now cramping this person, then the other—until, at last, we have been compelled to take a decisive step, and *remove.*

Good fortune attending us, we have found a commodious suite of rooms, light and airy, near to our present quarters, but in a more central position. Where the Old Brick Church once stood, there stand we. Our offices w l be found in the block known as the "Park Building," our new address being Nos. 37 Park-row and 145 Nassau-street, having an entrance on each street.

This removal will be for the good of the clients of our Patent Agency, as well as all our other friends. In our new offices they will find, when they call upon us, (as we hope they soon will do,) everything they can require to aid them in securing the productions of their ingenuity to themselves or assignees by Letters Patent in this or any other country. Extensive and growing as our business now is we expect, and are prepared to see it augment every day with increased speed; and although we have done much where we are, yet in our new offices we shall be able, without difficulty, to perform the whole patent business of the United States, should it be required of us.

To return to ourselves—that is, "ourselves" editorially—the only change that we ever intend to experience is improvement. The only way that we ever intend to look is "upward and onward;" and as we have always fearlessly spoken our honest opinions, so we shall always continue to do. Our constant aim and endeavor shall be to lay before our readers, weekly, a mass of information of real value, told as pleasantly as we can. In removing, we hope to carry with us all our old friends, and trust that they will bring with them many new ones.

The present number of the SCIENTIFIC AMERICAN issues from our new offices, Nos. 37 Park-row and 145 Nassau-street. Let all our friends remember where we are to be found.

AFRICAN WOOL.—Five million pounds of wool were shipped last year to England from Algoa Bay, South Africa. Its value amounted to $1,400,000.

Meteorology.—No. 2.

The aerial ocean which surrounds the earth consists of atoms of matter which are self-repellant; and in proportion as the pressure upon them is diminished, they constantly tend to separate from each other, and produce an expansion of the whole mass. When the pressure upon them is increased, the mass is diminished in volume, but the force of their repulsion is increased. From the constitution of the air, it follows that the density of the atmosphere at the earth's surface is much greater than at a higher altitude. At the level of the sea it is 1, at 3·4 miles it is only ½; therefore one-half of the whole weight of the atmosphere is found within the limit of three and two-fifth miles; and one-third of the whole quantity is beneath the level of the Rocky Mountains. This fact has an important bearing on the influence of mountain ranges in modifying the direction of the winds.

The question has oftentimes has asked, "Why does the air grow colder as we ascend?" The answer is easily given. A pound of air at all distances above the earth contains an equal amount of heat with the same weight taken at the surface, but as the pressure decreases upward, the air is expanded, and occupies more space, consequently its heat is more diffused, and therefore less intense, hence it must be lower in temperature as we ascend. A large sponge containing a small quantity of moisture seems almost dry, but by squeezing it within the hand we condense the moisture, and extract the water. This comparison may be applied to the heat in the air. The exact diminution of temperature in the air as we ascend is not actually known. Celestial space (that void, as some call it, outside of our atmosphere) has a temperature of its own, which is supposed to be about —60°. In temperate latitudes it is usual to allow a fall of one degree for every 333 feet of elevation, or three degrees in 1,000 feet.

The repulsion of the atoms of air is increased by heat as well as pressure. The air expands 1-491 part of its bulk at the freezing point by the addition of each degree of heat, and thereby becomes lighter, and ascends. The heat of the sun thus acting upon the atmosphere is the great motive power which causes all the winds and breezes in the aerial ocean above us. As the air at the equator is 82° in temperature, zero at the poles, and 60° below zero in space, the air at the equator ascends, then flows over at the top along an inclined plane to the poles, where it sinks, and then flows back again below to the tropics, thence up again to the poles, and so produces a constant circulation. But these currents are not regular along the meridians; various causes prevent their regularity. The earth itself revolving on its axis is the cause of the trade winds, which blow constantly within the parallel of 30°. There are three distinct belts of wind in each hemisphere, as calculated by Professor Coffin, namely, a belt of easterly winds within the tropics; a belt of westerly in the temperate zone; and a north-westerly belt at the north. These belts are not stationary, but move laterally towards the south or north, according to the positions of the sun at various seasons of the year. Their breadths also vary; they are crowded into a smaller space towards the pole in the winter, and expand into a wider space in the summer. The condensation of vapor which arises from the surface of the ocean and is carried to different parts of the earth, disturbs the regularity of the atmospheric currents. The heated air which ascends at the equator is saturated with moisture, which it has absorbed in passing over the northern and southern oceans. As it ascends, it continually meets with a diminished temperature, and as the sun declines to the west, a considerable portion of it is converted into water, which descends to the earth in the form of rain. The greatest amount of this action is at the tropics, and there is a belt of intertropical rains which oscillate with the course of the sun in its annual changes of declination. A portion, however, of this vapor is probably carried on the upper current of air even to the polar circles, and there deposited in fertilizing rains.

The condensation of the vapor which is evaporized from the ocean at the equator, evolves a great power in the form of heat, which has a very great effect on the motions of the atmosphere. It is calculated that by every cubic foot of rain which falls on the face of the earth, sufficient heat is liberated in the atmosphere to produce 6,000 cubic feet of expansion of the surrounding atmosphere beyond the space which the vapor itself occupied. This accounts for the moisture being condensed into a space much less than that which it formerly occupied, and that air has more than five times less capacity for heat than water. The ascensional force evolved by the condensation of vapor must, therefore, be immense. This accounts for violent and irregular gusts of wind (according to Mr. Espy) during thunderstorms, &c. If the wind blows over a surface only a little above the earth, the vapors in it will not be sufficiently cooled to condense into rain; but if it meets with a mountain in its course, so as to make it ascend, the vapor will be condensed on the windward side by the cold due to the increased vertical hight. The moist air which ascends the windward sides of the mountains in South America and Mexico is so cooled as to deposit its moisture in rains, and when the elevations are very great, the air passes over them to the other side, robbed of its entire moisture, and never drops a shower to fertilize the fields. The general idea that mountains attract vapor, is not founded on any established principle of science.

Silicates Applied to Cements and Paints.

A very interesting report addressed to the French Minister of Agriculture, Commerce, and Public Works, has recently been published in the Paris *Moniteur*, by a commission appointed to examine into the methods discovered by M. Kuhlmann, professor of chemistry, for hardening cements, porous stones, and paints with silicate of soda. As this has been a somewhat controverted subject in our columns, information regarding it from a disinterested source is of importance.

This report states that if eleven parts of the silicate of soda in powder is mixed with eighty-nine of common lime, it makes a good hydraulic cement which will harden under water. This fact proves the great affinity between lime and silex; and M. Kuhlmann has found that a solution of the silicate, when mixed with common chalk, becomes carbono-silicate of lime, which strongly adheres as a paste to the surface of wood and stone, and in the course of time becomes very hard, and thus forms a very durable mastic cement. The sculptured part of the new Louvre, in Paris, has been treated by the silicatizing process. A solution of the silicate of potash, in strength 35° Beaumé, was diluted with twice its volume of water, and was applied to the front of the building in jets, by means of force pumps; the result has been that the porous surface of the stonework has been rendered very hard and durable. By mixing the sulphate of copper with the silicate, it imparts a green color to it, which, when applied to a bust of plaster of Paris, gives it an antique bronze appearance; the sulphate of manganese gives it a brown color; the oxyd of zinc makes it a beautiful white. These colors are more applicable to stone than wooden surfaces, as the latter contain resin which prevents a uniform shade being secured. India ink ground with the silicate makes an indestructible ink for writing. In calico-printing the silicate has been employed in place of albumen, to fix the colors. The report, as a whole, endorses silicates of soda and potash as applicable to a great number of new and useful purposes.

Ice Phenomena.

A recent number of the *Canadian Journal of Industry and Science* contains some exceedingly interesting information regarding the expansion and contraction of ice on Rice Lake, C. W., by J. H. Dumble, C. E. A bridge of the Cobourg and Peterborough railway runs through this lake, and in our southern States, or in a mild climate, it would have answered every purpose; but with the expansion of the ice on this lake in such a cold climate it has become a complete wreck. The ice after it is formed is subject to great expansion and some contraction by changes of atmospheric temperature—a fact which has not before, we believe, been recognized. *Glare ice* is that which is smooth on the surface; it has been found that such ice, when acted on by the mid-day sun, is immediately set in motion by expansion, and it generally sets in towards the shore. Sometimes this movement is very gradual, and accompanied with a slight crackling noise; sometimes it is rapid and violent, and accompanied by a succession of vigorous jerks, and a hollow rumbling sound, seemingly from under the ice, while at intervals there occur loud and sharp reports, like those of cannon.

Sometimes the ice expands several feet on the shore without any fissures being created in the lake; this is caused by a temperature of the atmosphere higher than that which previously existed. If the thermometer indicates a temperature of 30° below zero, and then suddenly rises to zero, expansion of the ice results. When the thermometer indicates 30° above zero, and then falls to zero, contraction of the ice is the result. The force with which ice expands depends entirely on the *extent* of the *change* of temperature.

The most forcible movements of ice occur previous to rain storms. A sudden rise of 20° in temperature produces violent expansion. Strong oak piles in the bridge, which would not bend, were cracked and splintered by the ice expansion; heavy cap timbers of pine were snapped like reeds, and heavy iron rails were curved and doubled up, as if put into a huge press. Trees growing on the shore have been torn up by the roots by the ice expansion, and boulders weighing several tuns have been lifted from the shore, and forced into the bridge timbers. On one occasion the ice expanded no less than six feet along the whole shore. A uniform temperature of the atmosphere neither causes expansion nor contraction of ice; it matters not whether the temperature is high or low, no movement of any kind takes place. A coating of snow six inches deep effectually prevents any motion in the ice, as it is a most effectual non-conductor, and protects it from the influence of the atmosphere.

Ice does no possess the power of contraction to the same extent as that of expansion. It has been noticed that when it expands some feet, it does not recede when the temperature falls to its former situation, it only contracts by inches for its expansion in feet.

McCormick's Patent Extension Rejected.

Just as we were going to press we received a telegram from Washington, announcing the refusal, by the Hon. Commissioner of Patents, of the above important case. Our despatch states, as the reason for refusal: "The invention was a small one, and the patentee had been fully remunerated." We shall endeavor to give the decision at length in our next issue.

NUMBER OF HUMAN BONES.—It is a fact, which, apparently, is not generally known, that there are thirty-two bones, neither more nor less, in all the divisions of the human body. Thus, there are thirty-two teeth, thirty-two spinal junctions, and so on.—*The Builder.*

COAL OILS.—In our next number we shall publish some useful practical information regarding the history and manufacture of coal oils.

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Iron Girders and Beams.

[Concluded.]

Fig. 4, which may be considered a compound beam, affords a clear idea of the cohesion among the fibers along the center line of the beam. The two opposite forces in the upper and lower halves of the beam are met and resisted by the cohesion along this center line. *c* is the neutral point. Inasmuch as writers on the strength of materials have demonstrated that the curve of equilibrium for arches uniformly loaded is the parabola, I have a method of forming a parabolic curve that I have not seen published, which is very simple, and enables me to demonstrate that

Fig. 4

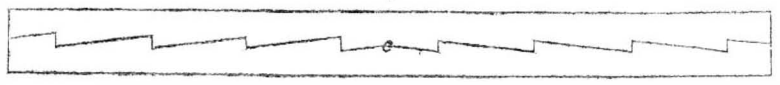
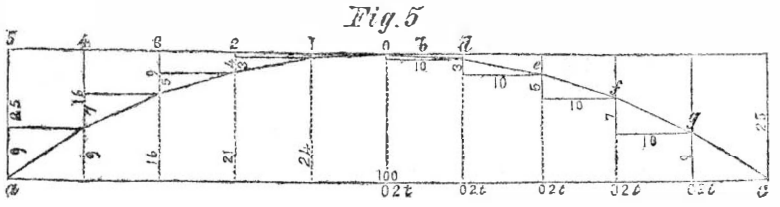


Fig. 5



[The horizontal and vertical distances in the above figure are not from the same scale.]

of the odd numbers to the demonstration of the curve of equilibrium, but will first assume that the horizontal thrust of an inclined brace or semi-arch, as compared to the weight producing the thrust, is directly as the ratio of the vertical distance to the horizontal distance, measured on lines drawn vertically and horizontally through the extremities of the brace or semi-arch, and terminating in each other, or inversely as the ratio of the horizontal to the vertical distance. Let the arch, *a b c*, be divided into any even number of equal horizontal distances, say ten, as in Fig. 5. Let it be supposed that the weight distributed over each division is two tuns, and that it is concentrated at points, *b d e f* and *g*. The weight at *b* will be sustained, one-half by the left half of the arch, and the other half by the right half of the arch. One-half of two tuns which is sustained by the right half of the arch corresponds to 1, the first deflection of the parabola, and the horizontal distance being 10, the horizontal thrust will be 10. The one tun at *b* will, through the arch, be transferred to the point, *d*, which, added to the two tuns already there, make three tuns, and three tuns correspond with the deflection 3 of the parabola. The horizontal distance being 10 as before, and the vertical distance being 3, the horizontal thrust for one tun will be $3\frac{1}{3}$ tuns, but for three tuns will be 3 times $3\frac{1}{3}$ tuns, or 10 tuns as before. The three tuns at *d* are transferred through the arch to *e*, which, added to the two tuns already there, make five tuns, and five tuns correspond with the 5 deflection of the parabola. The horizontal distance being 10, and the deflection or vertical distance being 5, the proportional thrust will be 2 and there being five tuns at the point, the total horizontal thrust will be 10 as before.

Thus the calculations may be continued for any length of arch, or for any number of subdivisions—the greater the number of subdivisions the more perfect the arch. The weight on one-half of the arch is ten tuns; if one half of this weight should be placed on the crown of the arch, it would produce the same horizontal thrust, as the whole weight concentrated at its center of gravity. The half span of the arch being 50, and the rise being 25, the proportional thrust is 2, and the thrust from five tuns placed on the center of the arch is 10, as heretofore.

D. H. Morrison.

Dayton, Ohio, January, 1859.

Russia Sheet Iron.

The *Ottawa Register* has the following brief article on the above subject:—

"Atkinson says (speaking of Russia sheet iron, which is manufactured in Verkne Issetzskoi Zavod, a mining town, belonging to the Yakovlif family, about three versts from Ekaterineburg, in the Oural), 'the sheet iron made in this Zavod, and at some of the other works belonging to it, surpasses all other productions of the kind, either in the Oural or elsewhere. It is rolled for various purposes.—for covering the roofs of houses, for sheet iron stoves, also for the manufacture of a great variety of utensils. The metal is of so excellent a quality that I have seen it rolled as thin as post paper without either crack or blemish, and with a jet black polish. An enormous quantity of the various sorts of this manufacture is sent to America, where it is most used.'"

The editor, Mr. H. D. Post, says, in reference to this, that "the secret of the excellence of the Russia sheet iron is the quality of the metal, which is manufactured from the magnetic iron ores of the Oural. The experiment ought to be tried whether the Lake Superior iron would not roll into sheets of equal quality."

We have heard from some of our American engineers, who have been in Russia, statements of similar import to those of the above extract. It is not, however, the ductility of the Russia iron which constitutes its peculiarity, but its dark shining surface. It is not an enamel, as some have supposed, else it would soon crack off. Prussian and English iron has been rolled out into leaves much thinner than any sheet iron we ever saw, but these leaves did not have such a beautiful dark surface. Some American sheet iron approaches the Russian in appearance when new, but the surface appears to have a sort of scale or coating, liable to crack off in bending and by exposure to continued heat.

Strength of Riveted Iron Plates.

Messrs. Editors—I have made some experiments on the power of the riveted joints of plates to resist tension. From these I have deduced the following data:—Strength of the plates, 100; when double riveted, 70; when single riveted, 56. These results, however, are subject to some modification. The power of a joint to resist tensile strain must depend, to some extent, on the closeness of the rivets, or the number of rivets of a given size and in a given length of joint. The several experiments made by me give 22·519 tuns per square inch when the plates were torn in the direction of the fiber, by the force being exerted perpendicular to it; and 23·037 tuns when torn in the other direction, or across the fiber. Yours, truly,

John McRay.

Washington, D. C., Feb., 1859.

Notes and Queries

*** Persons who write to us, expecting replies through this column, and those who may desire to make contributions to it of brief interesting facts, must always observe the strict rule, viz., to furnish their names, otherwise we cannot place confidence in their communications.

J. R. M., of Washington City—Your improvement in skates seems to be new; but we advise you to call at our office in your city, corner of F and Seventh st., and take advice upon the matter.

W. H., of Pa.—Add one ounce of gum arabic to every pound of raw starch, and it will render linen more stiff than by the use of starch alone.

D. N. W., of Ill.—In No. 5, this volume of the Sci. Am., you will find a notice of a family knitting machine. See also last number of our paper.

E. T. R., of N. Y.—The idea of suspending a telegraph wire across the Atlantic Ocean by means of balloons is a wild visionary scheme, and has neither merit or novelty to recommend it.

A. S., of Iowa.—A solution of borax will remove the scurf from the head, but it is said to be injurious to the scalp. It is our opinion that dandruff causes the hair to fall off.

G. P. T., of Wis.—The recoil of a gun is caused by the sudden back-pressure of the powder.

Waterproof Porous Clothing.—M. A. Puckridge, of Newark, N. J., notices, in a letter to us, our remarks on page 141, present volume, in regard to the tunics prepared for the French army. He states that we regarded it as a new discovery; but we distinctly stated n the article referred to, that it was not a new discovery. He informs us, however, that the process described for waterproofing, with the addition of a compound mordant for fixing it, was once carried on by him in London; and he had thus prepared a great number of cloaks and overcoats for the British army. This business he has recently commenced at Newark.

J. E. K., of Mass.—The use of pumice-stone as a medium in a burner, as you propose, for purifying the gas, is old.

E. C., of Pa.—There is no first-rate work on American millwrighting published. Nor is there one on hydraulics that comes up to the science and practice of the present day.

J. F., of ——.—The camphor mixture for a "storm glass" is composed of camphor first dissolved in strong alcohol, after which ten per cent of water is added. A little nitrate of potash may also be added, but it is not positively necessary.

W. H. W., of Mass.—If you will get "Dick's Practical Astronomer," it will teach you how to make telescopes. To make a cheap one, you can use tin for the tubes instead of brass. It will be better for you, however, to purchase the lens from some optician, as they are difficult to grind. The tubes only require to be coated with black varnish inside, and the glasses set in, to make a cheap telescope.

J. C. S., of Ind.—A top is made to spin on its point by the action of two forces—first, the one applied to rotate it, and second, that of gravity. The former gives it the spinning motion on its axis, and maintains its heaviest end uppermost the latter keeps it on the ground,

H. W., of Md.—There is no good work published on the manufacture of coal oil. You will learn more about it in the pages of the Scientific American than any other published work. The new edition of Knapp's Technology is published by H. Balliere, 290 Broadway, this city.

F. E. C., of N. Y.—You cannot repair your meerschaum so as not to show where mended. The best way to join the pieces is by a paste made of plaster of Paris and white of eggs.

J. L., of Ky.—The color you notice on your boiler is produced by oxyd of iron, the tint of which is lightened by the lime in the water.

Consumption of Products.—It has been calculated that the inhabitants of cities consume, in food, clothes, fuel, &c., thirty times their own weight annually. The population of New York city, numbering 600,000, with an average weight of 120 pounds each, will thus consume 216,000,000 pounds annually. All parts of the world are laid under contribution for their supplies.

J. S. D., of Burlington—Your plans for a sugar mill we should think, are very complete, but we do not discover anything in it that is patentable. Had you given us your address, we should have written to you by mail at length.

J. W. N., of Conn.—The surface of cast iron, after being filed into shape, may be case-hardened by covering it with a paste of flour and prussiate of potash, allowing it to dry, heating red-hot, and then immersing in cold water.

M. B., of N. Y.—If it could be shown that A had abandoned his invention to the public, the patent would be invalidated. If B patents an invention previously invented by A, and by him abandoned to the public, B's patent would be valueless.

J. S., of Ga.—None of the dangerous burning fluids will explode by thrusting an ignited match into them. The fluid used in "vesper light" lamps is camphene, which is not held to be explosive. None of the fluids become explosive until they are evaporated into gas, and mixed with eight volumes of the atmosphere; all burning fluids will become explosive when so combined. The most volatile fluids are the most dangerous.

L. & D. T., of N. Y.—Yes; you have a right to repair a machine obtained and in use prior to the grant of the extended patent.

J. H. B., of ——.—A party selling a patented article without the word "patented" and the date of the patent marked on it, is liable to a fine of $100 for every offense. If the machine contains parts covered by several patents, the date of each should be marked on it, to comply with the strict letter of the law.

J. N. C., of Ind.—The reason why it feels colder on a windy day, when the thermometer indicates a temperature no lower than on a calm day, is owing to the rapidity with which the air in motion carries off the heat of the body; fresh quantities of cool air are being continually brought into contact with the body, in the same manner that a condenser cools the steam of an engine. A siphon thirty feet high may be used to empty a sinking ship. It is supposed that there is a circuit of a single current in a magnet, and also in a telegraph line, and that it passes out of one pole and enters by the other. This theory is adopted to explain why a negative pole in one magnet repels the negative pole of another one, and *vice versa*.

A. C. L., of Pa.—There is no small elementary work on machinery published. There was a process employed in England for silvering glass globes with pure silver instead of an amalgam. At present we cannot give you the particulars in regard to its practice.

G. L., of ——.—We have never seen a stove constructed for the simple purpose of heating a bath tub. The glaze is put upon shirt collars by the friction of the flat iron; a little gum arabic is mixed with the starch, to give it greater stiffness. The flat iron should be very warm, and rubbed over the linen rapidly. Use a hard block under the collar to iron upon. It requires skill to do it in style.

H. J. B., of Pa.—We cannot tell what pressure a boiler can withstand unless we know the thickness of the metal; also the diameter and length of boiler. The space of three inches exposed to high heat in your boiler, when this water is flush with the lower gage cock, will not readily become red-hot; still, you should never allow the water to fall so low.

R. E. M., of Ohio.—Machines to keep up currents of air in hot rooms, and to brush away flies and musquitoes, are known and used in some sections. As early as 1830 Commodore Barron, of the United States Navy secured a patent for a mechanical device of this character.

M. A., of Pa.—The question is not "who first filed the caveat," but who first made the invention. When applications for the patent are made by each caveator, then the Office will, before issuing patents to either, require proof upon the question of priority of invention.

A. J., of R. I.—An opening 8¾ inches and 1¾ wide, under a head of 20¼ feet, will discharge 1,809 cubic feet of water, and your turbine wheel, with 30 such openings, will therefore discharge 54,270 cubic feet per second.

The word "botany" is derived from the Greek word *botane*, grass or plant, and it is hence applied to the science which treats of the nature and varieties of plants.

The largest star seen in the sky is one in the South, called the Dog-Star. From calculations, it is known that its distance from us is not less than nineteen millions of millions of miles. Other stars have been calculated to be forty-two thousand times more distant than it, and light, which travels at the rate of a million of miles in five seconds, must be sixty-three thousand years in traveling from them to the earth.

S. W., of N. Y.—Milk is sold in a frozen state in our Northern cities, and also in Canada. You could not get a patent for such a discovery. You may be able to obtain a patent on a useful machine for scrubbing floors; it would be a humane invention for the ladies. A machine to wash milk pans and dins would also find favor with the fair sex. Churns are so numerous in form and character, that we cannot give advice until you have developed your plans more fully. Candles, in our large chandlery works, are dipped in frames.

H. A. N., of N. Y.—Five parts pure silver and one part of brass, make a soft silver solder. Some persons use pure tin as a soft, cheap silver solder, which flows easily.

O. P. S., of N. Y.—You are perfectly right in assuming that a cubic foot of hewn timber is just as heavy as a cubic foot of round lumber of the same sort. The weight of a cubic foot of oak is about 60 lbs.; of a cubic foot of cedar, 35 lbs.; and a cubic foot of lignum-vitæ, 83 lbs.; from which you will see that 40 feet of oak make about a ton, while 50 feet of cedar would only weigh 1,755 lbs.

L. K., of Pa.—You state that about the latter end of July, 1857, an agent in your place undertook to get out an English patent for an invention, for which he was paid $500; and that the inventor had not been able, as yet, to get his papers; and that you had purchased the right under this patent for the Canadas. This all comes of employing a man who knows nothing about the business. Our charges are much less than the above sum, and we can usually deliver the patent in four or five months after the case comes into our hands. An English patent does not cover the Canadas, therefore you have purchased and paid for that which has no legal existence or value. Inventors make mistakes when they entrust their cases to the hands of unskillful parties.

F. W. E., of N. Y.—A round barn of 50 feet diameter will contain 1,962½ square feet of floor area; a barn of a rectangular form, 180x50, will contain 9,000 square feet of barn floor area We cannot advise you to build a round barn, because it is troublesome to match the doors and other timbers. We prefer the rectangular form, one side of which can be effectually sheltered from the north winds, which would not be the case with a circular barn. Slate roofs require to be pointed with mortar to keep out fine drifting snows.

R. A. W., of Ala.—A ball descending from a certain point on an inclined plane arrives at the lowest point with a velocity which would be exactly equal to the velocity which the ball would obtain by falling down from the starting point to the level of the lowest point in a vertical direction, and this velocity would be just sufficient to elevate the ball to the same hight from

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which it descended on an inclined plane which rises from the lowest point, if no friction and no resistance of the air exists. From this you will see that under the most favorable circumstances, your ball will never reach the hight from which it descended, if left to follow its own gravity, no matter how you may arrange your inclined plane.

INVENTOR OF THE FAN BLAST.—Arthur Thompson, of New Orleans, inquires who was the first person that used a fan-blast in smelting iron? So far as he knows, his father made the first experiments with a fan for this purpose, which was fabricated out of an old pair of blacksmith's bellows. This was in the year 1831, and he introduced it into New Orleans in 1837. Some correspondent may be able to give information on this subject.

W. M. B., of Pa.—To re-gild your picture frame, give it first a thin coat of parchment size, and allow it to become partially dry, then lay on the gold leaf, and press it down with a thin bladed knife. The leaf will only adhere to the parts covered with the size. You can therefore easily remove the superfluous portion.

E. N. B., of N. Y.—Campbell Morfitt's work on tanning, published by H. C. Baird, Philadelphia, is a good treatise on the subject. Catechu, a mixture of alum and salt, blackberry bushes, and ferns have been used for tanning purposes as substitutes for oak and hemlock bark.

R. C., of N. Y.—We do not know what you mean by a "friction saw." If you mean saws without teeth, these are in common use for cutting marble and other stone. We cannot conceive how a boiler containing no water, and without a fire under it, should have indicated 25 pounds on the gage. It must have mistaken *its* vocation.

NUMBERS 4, 14, 17, and 19, this volume of the SCIENTIFIC AMERICAN, cannot be supplied, as we are entirely out of them.

D. W. L., of Cal.—We mailed to each of the club of subscribers you sent us, all but No. 4. We are entirely out of this number. We thank you for your good offices.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, January 29 :—

C. D. B., of N. Y., $30; J. A., of R. I., $30; J. McD., of Mich., $25; L. W., of Mich., $20; G. & G., of Pa., $30; C. W., of Iowa, $10; J. McK., of N. Y., $30; S. S. M., of Ohio, $25; R. & S., of Ohio, $35; N. P., of Pa., $25; M. G., of Conn., $30; J. W., of L. I., $75; H. H. E., of Ill., $30; J. C. B., of Texas, $25; J. P. A., of N. Y., $100; C. M., of N. J., $40; S. E. T., of N. J., $25; J. L. G. W., of Mich., $15; H. & A., of Pa., $25; D. F. S., of N. H., $25; I. D., of Mass., $55; O. H. M., of Iowa, $25: J. B. C., of Ind., $30; L. H., of N. Y., $25; S. K. S., of Conn., $55; T. L. B., of Ind., $25; J. L. R., of N. Y., $55; L. B. H., of N. Y., $30; J. J., of Ohio, $25; D. & B., of N. J., $30; W. L. H., of Tenn., $20; A. O., of N. Y., $25; A. B., of N. Y., $40; C. A. L., of N. Y., $30; J. A., of Ill., $25; J. W. L., of Mich., $30; B. B., of N. Y., $25; R. & S., of N. Y., $30; R. W., of Vt., $25; F. P. C., of N. C., $57; S. S., of N. Y., $30; C. M., of Wis., $25; H. H., of N. Y., $30; J. J., of N. Y., $30; C. S., of Conn., $30; D. H. A., of Texas, $30; W. & F., of N. Y., $30; H. S., of N. Y., $30: W. R. J., of Pa., $25; P. H. R., of Ind., $35; G. S., of Md., $60; and $25 (per express) from some unknown source. Who makes the remittance? The funds consisted mostly of bills on Hartford (Conn.) banks; but there was no mark on the envelope, or within it, to indicate by whom or from whence the money was sent.

Specifications and drawings belonging to parties with the following Offitials have been forwarded to the Patent Office during the week ending Saturday, January 29 :—

J. L. G. W., of Mich.; J. McD., of Mich.; L. H., of N. Y.; R. W., of Vt.; T. L. B., of Ind.; N. P., of Pa.; E. P., of Cal.; A. B., of N, Y.; G. S., of Md.; B. B., of N. Y.; D. F. S., of N. H.; G. & G., of Pa., (two cases); J. W. S., of Ill.; J. J., of Ohio; M. A. K., of N. Y.; J. C. B., of Texas; A. O., of N. Y.; P. H. R., of Ind.; H. & A., of Pa.; J. A., of Ill.; C. P., of Ohio; J. M. McD., of N. Y.; S. S. M., of Ohio; S. E. T., of N. J.; W. L. H., of Tenn.; W. R. T., of Pa.; C, A. L., of N. Y.

Literary Notices.

THE ATLANTIC MONTHLY. February, 1859. Phillips, Sampson & Co., Boston. This number contains, as usual, the solid information, lively fancy, and sound philosophy that peculiarly characterises this periodical.

THE DENTAL REGISTER OF THE WEST. J. Tuft, Cincinnati. This is an able quarterly, and contains the cream of dental information.

THE LADIES' MANUAL OF FANCY WORK: A complete instructor in every variety of ornamental needlework, including applique, bead-work, Berlin-work, braiding, bobbin-work, crochet, embroidery, golden tapestry, knitting, knotting, lace-work, muslin-work, French embroidery, netting, orne-work, patch-work, point lace, potichomanie, tapse d'Auxerre, tape-work, tatting, transferring, velvet balls, wire-work, shading and coloring, printers' marks, &c., &c.; with a list of materials and hints for their selection; advice on making up and trimming; a catalogue of articles suitable for wedding, birth-day and New Year gifts, and a glossary of French and German terms used in needle-work; the whole being a complete lexicon of fancy needlework, by Mrs. Pullan. Price $1 25. Dick & Fitzgerald, 18 Ann street, New York.

THE AMERICAN ALMANAC FOR 1859. Crosby, Nichols & Co., Boston; Sheldon, Blakeman & Co., New York. This is indeed, as its title states, a repository of useful knowledge, and as it has now attained the thirtieth year of its publication, we need say little of its value, except that it is a *vade-mecum* of information to every American citizen.

HOME WHISPERS. Published by the American Female Guardian Society, 29 East Twenty-ninth street, New York. This is a book full of common sense, advice to husbands and wives, fathers and mothers, being given anecdotically and in a pleasant style. The advice is so good that we hope all who read it will take it to themselves, and that it may be read by many of all classes and position. The profits of the work go to the "Home for the Friendless," an admirable institution, where practical Christianity shows what good it can do when allowed fair play.

IMPORTANT TO INVENTORS.

AMERICAN AND FOREIGN PATENT SOLICITORS.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, continue to procure patents for inventors in the United States and all foreign countries on the most liberal terms. Our experience is of thirteen years' standing, and our facilities are unequaled by any other agency in the world. The long experience we have had in preparing specifications and drawings has rendered us perfectly conversant with the mode of doing business at the United States Patent Office, and with most of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between nine and four o'clock, daily, at their principal office, 37 Park Row, New York. We established, over a year ago, a Branch Office in the City of Washington, on the corner of **F and Seventh** streets, opposite the United States **Patent Office.** This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at our office.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery Lane, London; 29 Boulevard St Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European patents secured to American citizens are procured through our Agency.

Circulars of information concerning the proper course to be pursued in obtaining patents through our Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the principal office or either of the branches.

The annexed letter from the late Commissioner of Patents we commend to the perusal of all persons interested in obtaining patents :—

MESSRS. MUNN & CO.—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill, and fidelity to the interests of your employers.

Yours, very truly, CHAS. MASON.

Communications and remittances should be addressed to MUNN & COMPANY,
No. 37 Park-row, New York.

CROSSETT'S PATENT STAVE CUTTER—Patented July 1, 1844; re-issued March 2, 1858; renewed and extended June 26, 1858. The above-mentioned machine is warranted to cut more and better staves than any other machine in the United States, and is the most simple, cheap, and durable. I hereby caution all persons against using and vending said machine (the main features of which consist in the stationary knife and vibratory bed-piece) without the legal right to do so. Offenders will be dealt with according to law. All persons wishing an interest in the extended term of said patent can obtain it by addressing the undersigned at Joliet, Ill.
21 7* GEO. I. CROSSETT, Assignee.

GREAT CURIOSITY—PARTICULARS FREE. Agents wanted. SHAW & CLARK,
21 4* Biddeford, Me.

THE WILLCOX & GIBBS' REVOLVING Looper Sewing Machine (illustrated in SCI. AM., Vol. 14, No. 21), is manufactured and for sale by JAS. WILLCOX, No. 715 Chestnut st., Philadelphia. This machine more fully meets the requirements of families than any heretofore produced, being at once simple, the workmanship perfect, and hence reliable. Competent agents are wanted. 21 4

SUN GAS BURNER—THIS BURNER HAS been selected as the best, and is now exclusively used for street-lighting by the cities of Boston, Worcester, Nashua, Providence, and other places.
SUN GAS BURNER COMPANY,
21 4* No. 14 Beverly st., Boston, Mass.

STEAM BOILER EXPLOSIONS—LOW Water Detectors. The surest indicators of danger from low water in steam boilers.
E. H. ASHCROFT,
21 4* No. 14 Beverly st., Boston. Mass.

"They are without a rival."—Scientific American.

WHEELER & WILSON'S SEWING MACHINES—Price greatly reduced. Send for a circular. Office, No. 545 Broadway, New York. 22 tf

INSTRUMENTS—CATALOGUE CONTAINING 250 illustrations of Mathematical, Optical and Philosophical Instruments, with attachment of a large sheet representing the Swiss instruments in their actual size and shape, will be delivered, on application, to all parts of the United States, by sending 12 cents in postage stamps. C. T. AMSLER,
22 7eow* No. 635 Chestnut st., Philadelphia.

TO PATENTEES—A GENTLEMAN ABOUT establishing a house in London for the purpose of introducing American inventions to European notice, is desirous of treating with patentees for agencies. Best references in New York and London.
Address, ALFRED A. PAGE,
1* Hicksville, L. I.

WOODWORKING MACHINERY—WOODworth's Daniels' and Gray & Woods' planing machines. Sash molding, tenoning and mortising machines. Scroll saws, arbors, &c., made of good materials, and by experienced workmen, at Worcester, Mass., by BALL & WILLIAMS. 22 10*

PAPER MILL FOR SALE—ON THE fourth Monday in March, 1859, the Tuscaloosa Paper Mill will be sold at Tuscaloosa to the highest bidder at public sale. A splendid bargain is offered in this sale, and a fortune can be made by any industrious man who is thoroughly acquainted with paper-making. For full information address, H. S. WHITFIELD, Attorney-at-Law, Tuscaloosa, Ala. 22 4*

PATENT CEMENT ROOFING—A SUBSTItute for metal or wood as a covering for buildings; unequaled for repairing old roofs. State or county rights for sale. Cement for sale by the barrel, with directions for use. Agents wanted.
C. A. BREMNER & CO.,
22 2* Goshen, N. Y.

WARTH'S SELF-ACTING WOOD-TURNING LATHES.—The best and most practical now in use; one boy will accomplish the work of four men. State and County rights for sale. Address A. WARTH, care W. H. Bertling, 23 Chambers st., New York, or the manufacturers, who have machines of all sizes on hand. Also a general assortment of machinists tools. Circulars sent. Address CARPENTER & PLASS, 479 First ave., New York. 22 2*

PATENT HOMINY MILLS FOR SALE—A late improvement. Works easily by hand; produces a superior article of hominy; capacity, one bushel per hour. This mill is simple and durable, and weighs 15 pounds. Retail price $5, or $36 a dozen. Orders for mills promptly filled. Also County and State rights for sale. Apply to B. BRIDENDOLPH, Patentee, Clear Spring, Md. 22 3*

FOR SALE—AT A BARGAIN FOR CASH, ONE new iron planer, which will plane 13 feet in length, 38 inches in width, and 36 inches in hight; weight, 10,000 lbs. Address WM. T. SCRANTON, New Haven, Conn. 20 4*

A. L. ARCHAMBAULT'S PORTABLE ENgines on wheels, (introduced July, 1849,) for hoisting, pumping, driving ore washers, circular and up and down saw-mills, thrashing machines, cotton gins; also connected to country grist mills, to assist water power, or to work without the assistance of the water as the case may be. Descriptive circulars on hand. Address A. L. ARCHAMBAULT, Fifteenth and Hamilton streets, Philadelphia. P. S.—Orders filled in two to three weeks. 20 4*

A CLEAR, STEADY, AND DIFFUSIVE light from illuminating gas, with a saving of 15 to 30 per cent, is secured by the Patent Lever Gas Regulator—patented June 22, 1858. This regulator is the simplest and cheapest; and its uniform success wherever applied during the past 18 months, proves it to be the best ever offered to the public. Persons desiring to introduce a well-tried article will find this one a prolific source of profit, requiring a very small capital. Town, city and State rights for sale. Address JOHN H. COOPER, Patentee and Sole Manufacturer, No. 866 North Sixth st., Philadelphia, Pa. 21 4*

STEAM GAGES—MAXIMUM HAND. E. H. ASHCROFT, 14 Beverly st., Boston, Mass. 21 4*

GROVER & BAKER'S CELEBRATED Family Sewing Machines—495 Broadway, New York; 18 Summer st., Boston; 730 Chestnut st., Philadelphia; 137 Baltimore st., Baltimore; 58 West Fourth st., Cincinnati. A new style—price $50. This machine sews from two spools, as purchased from the store, requiring no re-winding of thread. It hems, fells, gathers and stitches in a superior style, finishing each seam by its own operation, without recourse to the hand-needle, as is required by other machines. It will do better and cheaper sewing than a seamstress can, even if she works for one cent an hour. ☞ Send for a circular. 19 13

WROUGHT IRON PIPE FROM ⅛ OF AN inch to six inches bore; Galvanized Iron Pipe (a substitute for lead), Steam Whistles, Stop Valves and Cocks, and a great variety of fittings and fixtures for steam, gas, and water, sold at wholesale and retail. Store and Manufactory 76 John, and 29, 31 and 33 Platt st., New York. JAMES O. MORSE & CO.
18 13

WATER WHEELS—BALDWIN'S "UNIVERSAL TURBINE" gives better satisfaction than any other water wheel, the overshot not excepted. It gives a higher percentage, with a partially raised gate, than any other. It gives from 75 to 97 per cent, according to the size of wheel and head applied. When you purchase a water wheel, my friends, get the best, if you would save money, as the best is always cheapest in the end, and you will have to make no changes. For further information address, S. K. BALDWIN,
Laconia, N. H.

"We have examined a model and drawings of the 'Universal Turbine,' and believe it to be a scientific water wheel, and one calculated to give the greatest amount of power from a limited quantity of water."
—Munn & Co. 18 13*

COTTON-OPENERS AND CLEANERS—Kitson's latest improved Cotton-openers, which were introduced September, 1857, have been adopted by the following companies, of Lowell, Mass.: Suffolk, Lawrence, Tremont, Appleton, and Prescott Corporations; and the Pacific Co., Lawrence, Mass.; Cocheco Co., Dover, N. H.; Salmon Falls Co., Salmon Falls, N. H.; Ogden Mills, Cohoes, N. Y., and other places. For price and other particulars enquire of RICHARD KITSON, Lowell, Mass. 21 5*

ATHENS FOUNDRY AND MACHINE Works want a Pattern-maker of steady habits, a knowledge and experience in gearing, mill-work, and general repairs, and construction of working drawings required. One that would take an interest in the works preferred. Also a blacksmith to take charge of and do the forging. Address, REUBEN NICKERSON, Agent, Athens, Ga. 21 2*

PAGE'S PERPETUAL LIME KILN—PATented 1854, 1857, and 1859—will burn 100 barrels of lime every 24 hours, with three cords of wood, or 1½ tuns of coal, not mixed with lime rock. Will burn every variety of lime rock, marl, or shells. Rights for sale. C. D. PAGE,
21 8* Rochester, N. Y.

WARREN'S TURBINE WATER WHEEL —Improved and patented by A. Warren and E. Damon, Jr. The vast number of these wheels now in operation, and the invariable success attending them, is the best evidence of their advantages over ordinary wheels in the economy of water power. The American Water Wheel Co. will send to applicants (enclosing two stamps) their pamphlet, containing engravings of turbines and a treatise on hydraulics. Address, A. WARREN, Agent, No. 31 Exchange st., Boston, Mass.
21 12*

STEAM WHISTLES—ALL SIZES OF THE most improved patterns constantly on hand. Brass Lift and Force Pumps, (single and double-acting) Ship Pumps, &c., a full assortment. Manufactured by
HAYDEN, SANDERS & CO.,
16 13 eow* 306 Pearl st., New York.

COBURN'S EXTRA OIL—FOR MACHINERY and Burning; warranted first-rate (never gums, will burn in night lamps, &c.) has given satisfaction for ten years during which we have sold it.
JOHN W. QUINCY & CO.,
16 13:5w * No. 98 William st., New York.

HOYT BROTHERS, MANUFACTURERS OF patent-stretched, patent-riveted, patent-jointed, Oak-Leather Belting; Store, 28 and 30 Spruce street. Manufactory, 210, 212, 214 and 216 Eldridge st., New York. A "Treatise on Machinery Belting" is furnished on application, by mail or otherwise—gratis.
16 12*

HARRISON'S GRIST MILLS—20, 30, 36 AND 48 inches diameter, at $100, $200, $300 and $400, with all the modern improvements. Also, Portable and Stationary Steam Engines of all sizes, suitable for said Mills. Also, Bolters, Elevators, Belting, &c., &c. Apply to S. C. HILLS, 12 Platt st., New York.
1 e3w

A MESSIEURS LES INVENTEURS—Avis Important.—Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront recues en confidence.
MUNN & CO. Scientific American Office, 37 Park Row, New York.

Zur Beachtung für Erfinder.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an
Munn & Co.,
37 Park Row, New-York.
Auf der Office wird deutsch gesprochen.

WATER POWER AND MILL SITE FOR SALE—The Society for Establishing Useful Manufactures at Paterson, N. J., propose to lease for 21 years, renewable for ever, a mill lot with six feet of water, to be taken from the first or upper canal, and discharged into the second or middle canal. The head and fall is about 24 feet. The mill lot is well adapted for any manufacturing business. This property is ready to enter on—is at Paterson, and convenient to the city of New York, with railroad and canal conveyance, in the heart of a large manufacturing population, and all the advantages incident to such a locality. For particulars apply at the office of the Society, Paterson, N. J. 17 6*

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IRON PLANERS AND ENGINE LATHES of all sizes, also Hand Lathes, Drills, Bolt Cutters, Gear Cutters, Chucks, &c., on hand and finishing. These tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address "New Haven Manufacturing Co., New Haven, Conn." 14 13

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Science and Art.

An Old Conical Ship.

A correspondent of the London *Engineer* states that a patent was taken out, in England, in 1852, by Joseph Burch, of Briggs Hall, Macclesfield, for a vessel which was of a double cone (spindle) form, but the propeller was placed at the stern. The object of Mr. Burch was to tunnel through the waves, to obtain a level gradient, and not lose time and space by mounting up and then sliding down the waves. On searching for a record of this patent, we find that it was granted on the 1st. of October of the foregoing year.

Structure of Anthracite.

It has been ascertained that anthracite coal is capable of division into very thin *laminæ*, all of which, examined under a microscope, give evidence of their vegetable origin. During combustion in an ordinary coal fire, the cinders which fly off are very good for these examinations; they easily split into thin layers and show vegetable tissues of various kinds. Even completely decarbonized coal shows this origin. The little white spots are the vessels. It is more difficult to examine soft coal, as the bitumen swells and obscures the vegetable forms. The principal forms observed are thin layers of elongated cells, scutatiform ducts and flattened tubes arranged in spiral lines, like rectangular cells around the charcoal-like masses.

Progress of Light and Knowledge.

It is really wonderful to witness the progress which some inventions have made, in spite of the most bitter and powerful opposition. This has been the case with gas-lighting in the city of Philadelphia. The Philadelphia *Ledger* publishes a document or remonstrance made in 1833, by a large number of the most wealthy and distinguished citizens, against lighting the city with gas. They relate in the document that lighting by gas is a most offensive and dangerous mode. They considered it "as ignitible as gunpowder, and nearly as fatal in its effects, and as it regards the immense destruction of property, we believe the vast number of fires in New York and other cities must be, in a great measure, ascribed to this mode of lighting." They also represented that if gas was introduced, "the water of the Schuylkill and Delaware rivers—now considered the most pure and salubrious in the world, as many long voyages have tested—must soon, we fear, experience the deterioration which has reduced the water of the Thames to the present impure and unhealthy state." They also represented that the fœtid smell of the drains from the gas-works would soon destroy all the fish in the rivers, and in conclusion, they solicited that "the lighting of the city with oil may be continued."

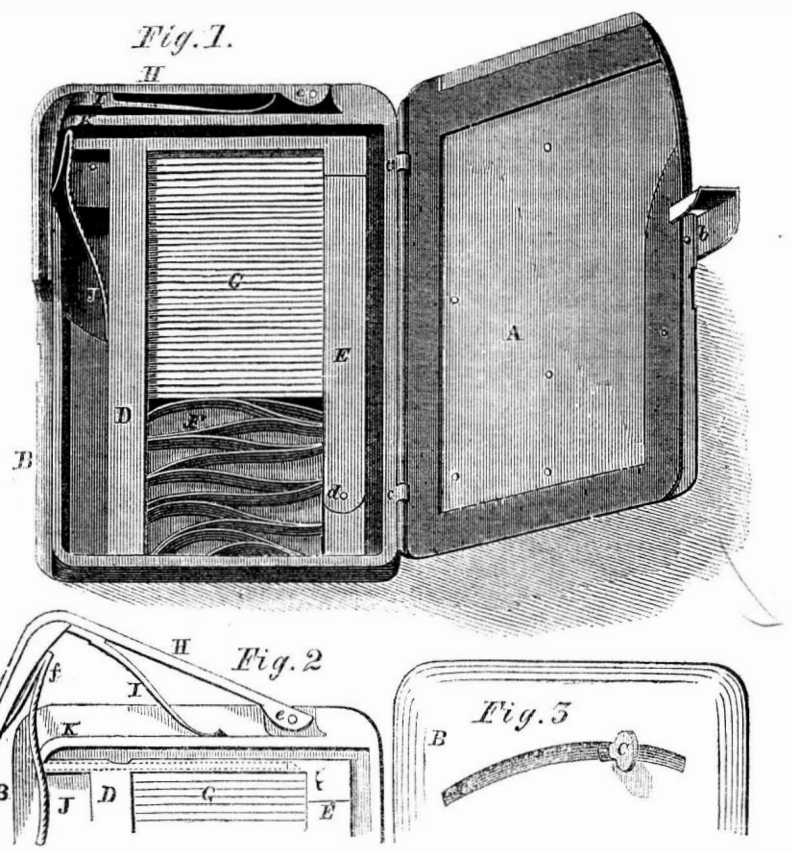
The keenest satire which can be published on the light which then shone upon the minds of such petitioners is that one of them, Mr. John C. Cresson, is now chief-engineer and superintendent of the city gas works which were erected in 1836, and which are now the pride of the very parties who remonstrated against their introduction. So we live and learn.

Improved Match Safe.

The traveler or hunter who has to wend his way through swamps, perchance to cross rivers, will be glad of a contrivance by which he can keep a supply of friction matches in his pocket safe from damp and moisture, and by which he can instantly procure a light, even in the most cheerless spots, where the snakes glide in and out among the oozy reeds, and the wild fowl cry forth their discordant noises overhead.

This match safe is shown open in Fig. 1. It consists of a port-monnaie-shaped case, B, with a door, A, that closes on it perfectly waterproof, in which position it is held by the catch, *b*, the hinges being seen at *c*. In the back is a small trigger, C (seen in Fig. 3), by which, without opening A, the matches can be forced out. Inside B is an inner case or receptacle, D, one side of which, E, moves on a pivot, *d*, to admit of the matches, G,

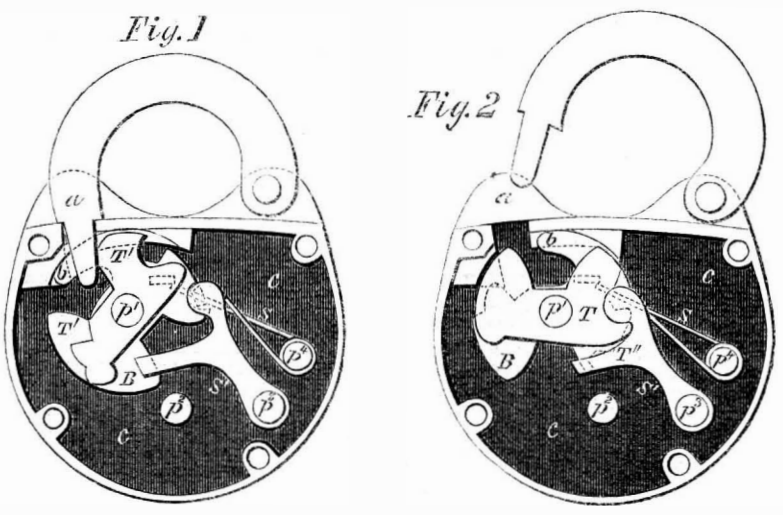
MERRILL'S MATCH SAFE.



J, is attached to the end of H, and when H is shut, this passes into a receptacle in the case, B, while its bent end, *f*, catches against the end of K, and holds H in its place. When a light is wanted, the trigger, C, is pushed, and as its inner part is always against the back or non-striking end of the top match, it forces it out of the case, D, along a little channel, until the frictional end comes in contact with the spring, J; this it forces out, releasing *f* from K, and the spring, I, instantly acts, pushing up H, and with it the serrated front of J, which, rubbing against the match, ignites it, and so a light is procured.

The inventor is Platt Merrill, of Port Similac, Mich., who will be happy to furnish any further information upon being addressed as above. It was patented October 12, 1858.

SCHNEIDER'S IMPROVED PADLOCK.



This lock causes the bolt to be shot through the shackle by the action of the shackle itself, but it cannot be unlocked except by the key from without. Our engravings fully illustrate the invention, which was patented January 26, 1858—Fig. 1 showing the shackle and bolt in a locked position, and Fig. 2 in an unlocked one.

The casing, *c*, and pins, p' p^2 p^3 p^4, are cast in one piece. The bolt, B, is a circular plate with a hole in its center, to fit on pin, p', upon which it can rotate; on this circular plate a bolt hook, *b*, is formed, and notches to catch the stirrup of the tumbler and trigger; and B has also a recess, which is so shaped as to present a cam-shaped surface to the bit of the key when caused to act upon it to make it move on p'. B has projections on the under side, one forming a collar passing over the pin, p', and supporting B. The other projection is a stud, which affords a hold to the spring, S, and it is so placed as also to limit the motion of the bolt. T′ is a tumbler set on the same pivot as B, and can rotate until it meets with the slotted end of the shackle, *a*. The shape of this tumbler cannot be described—we must refer the reader to the engraving. A trigger, S′, provided with a projection, T″, is placed on a pin, p^3, and the spring, S, presses on its back. To lock the padlock, the shackle is pressed in the lock, and the front of the shackle pressing against the tumbler, T′, and plate, shoots the bolt hook through the slot in it, and so fastens the lock. The trigger, S′, then falls, by the force of the spring, into proper notches in the plate and tumbler, and holds the bolt securely locked. The key, upon being introduced by having its tube placed on the spindle, p^2, will first lift the trigger out of the way, and then operate the bolt.

None but the proper key will open this lock, as all the parts have to be operated at the proper time in the process of unlocking and in their correct sequence, or the bolt cannot be shot. This is a good padlock, and although the parts are few, it is sufficiently complicated to be reliable and safe.

The inventor is J. Schneider, of Chicago, Ill., and any further information may be obtained by addressing Charles Best, Box 1,137, Post-office, at the same city.

Potatoes Then and Now.—In 1597, "Virginia potatoes," as they were then called, were just beginning to be known, and the sweet potato was cooked and eaten in a manner quite different from that pursued at the present day. An old writer says of them:—"They are used to be eaten rosted in the ashes; some when they be so rosted infuse them, and sup them in wine; and others, to give them the greater grace in eating, do boil them with prunes, and so eat them. And likewise others dresse them (being first rosted with oile, vinegar, and salt, every man according to his own taste and liking; notwithstanding howsoever they be dressed, they comfort, nourish and strengthen the bodie."

Borax has usually been made from the crude bi-borate of soda evaporated in Tuscany, but a new mineral—the borate of lime—has recently been discovered in South America, from which it can be manufactured.

MECHANICS

INVENTORS, MILLWRIGHTS. FARMERS AND MANUFACTURERS.

FOURTEENTH YEAR

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